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WE TAKE PLEASURE in stating that Mr. J. Parke Channing, Mr. Chester W. Purington and Mr. J. E. Spurr have joined our group of Special Contributors. These three gentlemen are so well known by reputation and by their contributions to the columns of this JOURNAL that it is not necessary to commend them to our readers. Our list of Special Contributors now includes fourteen authoritative writers, each of whom is a specialist in his own field of knowledge; all of them are men thoroughly representative of the mining and metallurgical professions, whose best interests it is our endeavor to serve.

ON AUGUST 15th, Dr. Joseph Struthers will resign his position of associate editor of the ENGINEERING AND MINING JOURNAL and editor of "The Mineral Industry," to become assistant to Dr. R. W. Raymond at the office of the American Institute of Mining Engineers. It is with no little regret on our part that this change will be made, but we are glad to say that Dr. Struthers will continue to take an active interest in the JOURNAL, and will become a Special Contributor. In wishing him every success in his new field of activity we take pleasure in congratulating him on the distinction of his new appointment and felicitate him on the honorable record which he has left on the pages of the two publications with which he has been connected for the past five years.

IT IS ANNOUNCED that while Mr. John C. Osgood will cease to be in active control of the affairs of the Colorado Fuel and Iron Company, the direction of the operations of this important enterprise remains in the hands of Mr. J. A. Kebler, the present general manager. This is a fortunate outcome of the recent reorganization of the directorate, for to those who live in Colorado it is well known that the wonderful development of the Fuel and Iron Company has been due to the indomitable energy and sterling ability of Mr. Kebler and the group of able technical men whom he has inspired with his own forceful spirit.

THE REPORTED arrangement under which the Australian Smelting and Refining Company is to devote a considerable portion of its works to the smelting of nickel ore from New Caledonia will furnish that company with profitable occupation for its well-equipped smelting plant, and if it is fully carried out it will introduce a new element into the nickel trade in competition with the International Nickel Company. Apparently the new producers will be entirely independent of the so-called trust, and if the plans are carried out, their production will be of sufficient quantity seriously to affect the market, should they fail to make any arrangements with the other companies. It is quite possible, however, that some such agreement may be concluded. Meantime the development is rather an interesting one.

IN HIS RETIREMENT at the end of a distinguished career General Miles will have the good wishes of mining men. It is nearly fifteen years since, from his headquarters at Fort Huachuca, he began the subjugation of Geronimo and his band of marauding Apaches. He did it thoroughly. To-day you can stand on the hill at Fort Huachuca and see the smoke of mines in active operation at Tombstone, Cananea, Bisbee, Pearce, Globe, aggregating over $200,000,000 in value. General Miles and the men under his command made this great mineral development possible. They wiped out the Apaches and gave the miner an opportunity. We wish the old General many years of happy life, free from the irritation of politics and the jealousies which appear at this time to be a part of army life at Washington.

THE REPORT of the Calumet & Hecla Company, which is given on another page, seems to show that the company's net earnings for last year were considerably more than the amount which it divided among its stockholders. The dividends paid for the year were $2,000,000, but there was an increase of about $3,000,000 in addition, in the cash on hand, and in other items making up the surplus. The report, as usual, is a very disappointing one, and really gives little information about the operations of the company. We are told that there was a decrease of about 4 per cent in the refined copper turned out; but nothing is said as to the percentage of copper recovered from the rock treated, the cost of producing the metal, or the average price at which it was sold. The company adheres to its long-time policy of secretiveness, and except for the dividends which they receive, the stockholders remain entirely in the dark as to the management and the present condition of their property.

THE STRIKE of the Alabama coal miners, to which we have hitherto referred, is to be settled by arbitration. It will be remembered that the coal miners, who have been working for several years under a scale based upon the price of pig iron, demanded an increase of 5c. per ton in both maximum and minimum rates, an eight-hour work day, and semi-monthly pay-days. The operators, as a compromise, offered an increase of 2½c. in the maximum rate.

Under the old scale the miners have been receiving 55c. a ton, the maximum, for over a year past. No agreement having been reached on July 1, when the year expired, the miners ceased work. Now, however, both the parties have agreed to arbitrate the question. The operators and the Miners' Union each name two parties, while for the fifth arbitrator they have agreed upon Judge George Gray, of Delaware, who was chairman of the Anthracite Strike Commission. As soon as his acceptance is received the miners will return to work, pending the settlement. The strike has been a very quiet one throughout, the operators taking on steps toward resumption, although several of the companies continued to work some of their mines in which convict labor is employed. On the other hand, the miners simply stopped work and made no demonstration whatever. Besides Judge Gray, the arbitration board will include two officers of the Miners' Union and two officers of operating coal companies.

We may add that the Sloss-Sheffield Iron and Steel Company, the second largest operator in the State, has withdrawn from the Alabama Coal Operators' Association for some reason which is not stated. The company, however, announces that it will abide by the result of the arbitration and will join in signing the new scale when adopted. In this case, the miners have taken what appears to be a very sensible course, and it is to be hoped that the matter will be settled upon equitable terms.

THE REPORT of the American Iron and Steel Association, as given on another page, shows that the production of pig iron in the United States, for the first half of 1903, was 9,707,367 tons. This was not only the largest on record, but exceeded the quantity produced in any complete year prior to 1899; moreover this half year's production exceeded the output for the entire year 1902 of any country in the world. Should production continue on the same level during the second half of the year, as now seems quite probable, our output of pig iron for 1903 will be over 19,000,000 tons. The table of the production by States shows that the increase of 898,793 tons over the first half of 1902 was made almost entirely in Pennsylvania, Ohio and in the Eastern States. This is still more marked if comparison is made with the second half of 1902; in other words, the great gain shown was in the furnaces of the Pittsburg district and the Mahoning and Shenango valleys. The old furnaces of New York and New Jersey showed a marked gain, which was due to the great demand for iron, and the fact that prices were generally at a level at which all furnaces could be run profitably. In the South there was comparatively little change in production, the furnaces turning out very nearly the same quantity. In Virginia and West Virginia, however, there was a considerable gain. The furnaces west of the Mississippi River, including Missouri, Colorado and the Pacific Coast, continue to make a very small showing. Their output in the last half year was less than 2 per cent of the total, and by far the greater part of this was from Colorado.

Coke remains our chief iron-smelting fuel. Nearly all the furnaces classed as bituminous use coke exclusively. By far the greater part of the iron known as anthracite is made with mixed anthracite and coke, the furnaces using anthracite alone making only an insignificant product.

Notwithstanding the very large production in the half-year, it will be seen that unsold stocks show only a very slight increase, and on June 30 last amounted to less than two days' average output of the furnaces.

MINING COMPANIES' REPORTS.

OUR FRIEND "Investor" contributes another thoughtful letter on a subject which is ever germane to the columns of this JOURNAL. In his remarks upon the reports of mining companies he evidently had his eye on annual reports, but many of his criticisms would apply to interim reports and indeed to those upon the evidence of which companies are, in the first place, organized. It should be scarcely necessary to say that a director is a trustee for shareholders "in theory," unless a theory be a synonym for an undemonstrated hypothesis. As a matter of fact the number of directors who hold themselves in such a responsible attitude toward their shareholders is far too small; only a short time ago we felt impelled to point to a glaring case of the abuse of such a position of trust on the part of directors, but we fear it is a matter of so common an occurrence as to excite but little comment. In another place in this issue reference is made to the example set by the directors of the Tomboy Company, who evidently do feel the honorable obligations of their office. This matter is vital to the wellbeing of mining as a well conducted business, and therefore it is a matter worthy of repeated insistence. Directors are trustees, *not* speculators licensed to use the information which they get in that capacity merely for the purpose of successful trafficking in the shares of their own companies.

In regard to the rights of shareholders and their manner of asserting them Mr. "Investor" is quite just. "To raise a row" and to ask footless explanations *after* the mischief has been done is only too common a procedure. Moreover, it has the great objection of giving an opportunity to mere hunters after an ephemeral kind of notoriety and for poseurs who play to the gallery of the daily press. Unseemly uproars at the public meetings of mining companies, after the directors have done foolish things, has only tended to obscure the issue and permit the wrongdoers to get away under the cloud of dust raised by aimless kicking. What is needed is persistent insistence on detailed reports, regular meetings and full statements concerning the actions of the board. It will be a happy day for legitimate mining business when the lack of full information and of regularity of procedure is held to be a sure sign of untrustworthy management, and when such management is reprobated in practice by the refusal of the investigating public to risk their money with persons, coteries or companies who pursue such methods.

COMPANY MANAGEMENT.

The departure of Mr. Whitaker Wright, under escort, to stand trial for the irregularities which occurred in his administration of the affairs of the London and Globe Finance Corporation is a reminder of the wreckage which marked the end of his career as a promoter. Whether he was more sinned against than sinning will be proved during the legal proceedings which he will face on arrival in London. If we are correctly informed, the financial melée in which he took so prominent a part was confused by treachery, and it may be that by the rules of the game he suffered unduly; but the rules of that game of reckless company mongering are as difficult for the average man to understand as the regulations which govern a frontier game of poker. The codes vary with the players, and acts which are ordinarily termed right and wrong become separated not by any well-defined line, but by a boundary such as separates Arizona and Mexico—a strip of land upon which the law of neither government is recognized.

We hope the further unhappy notoriety to which Mr. Wright is destined will serve to emphasize the utter rottenness of a system of company management which allows an adventurer to run the affairs of a mine without any check from the other members of the directorate simply because the latter are titled incompetents—incompetent not as pro-consuls of empire, naval commanders, military leaders, legislators, etc., competent to the highest degree attainable by human ability in their own professions and occupations, but none the less childishly ignorant as managers of a mining enterprise. It is not too much to say that the Marquis of Dufferin or Lord Loch no more understood the vagaries of a clever schemer like Wright, and had no more comprehension of the technology of mining, than an archbishop has of assaying! It is this aspect of the business of mining which Whitaker Wright's *debacle* illuminates with so lurid a light. Experience is a luxury which none should waste. The moral of the London and Globe episode is that mining directorates should be composed of knowledgeable men. Whether they have titles or not does not matter, but no title, from Admiral to Professor, should be deemed a qualification; what is needed is experience in the matter on hand, not the luminous tail of a K. C. M. G.

PROGRESS IN MEXICO.

This issue contains several articles descriptive of mining regions in Mexico. In later numbers we hope to publish others dealing with that prosperous country.

Owing to the extent of territory characterized by mining operations and the widely scattered distribution of the different districts, it is most difficult to generalize upon Mexican development. It can be said, however, that at no time in its modern history has our neighbor Republic attracted so much attention from those who go down mines in skips and see the wonders of the deep. Besides a large number of exploration and development companies which have been organized in New York and other financial centers to exploit Mexican mines, the first half of the current year has been marked by the transfer of several large mining properties to American and English financial houses. The Guggenheim Exploration Company is credited with important purchases, and among other negotiations successfully concluded it is fitting to mention the Esperanza mine, at El Oro, so long associated with the late August Sahlberg.

The Guanajuato district is the scene of great activity, and there is reason to expect a further stimulus on the proximate completion of the electric power plant, which promises to contribute notably to economy in mining operations. At El Oro there are three or four mines of the first rank, all of which give indication of further enhancement in value. Among these El Oro, Esperanza, Dos Estrellas and the Victoria are conspicuous. In Durango the transfer of the Velardeña mines and smelter to the Guggenheims is an important event, and likely to lead to further investments in that neighborhood. In the Chihuahua region, the Santa Eulalia district continues to develop satisfactorily in depth, and exhibits a continuation of the large ore-bodies in limestone which characterize this important mining area. The Santa Barbara district and the vicinity of Parral, also in Chihuahua, have been described in these columns lately. This is one of the most important and expanding regions of Mexico. Northern Sonora is gaining in importance as a copper producing region. Nacozari, Cananea and other districts on the southern side of the international boundary are connected in an economic sense with Bisbee, Pearce and the outlying camps in Arizona which have lately come to the front.

These references to particular tracts of mining country in Mexico are illustrative of the awakening of the old Aztec land to the vivifying touch of American energy when backed by capital. In this development we take a reasonable pride and a sustained interest.

A NEW CALIFORNIA ASSOCIATION.

THE DESERT Mine Operators' Association has been formed in Los Angeles to include mine owners in Southern California, Southern Nevada and Arizona. The object stated is "to foster and develop the mining industry in all its branches in the district covered by the Association." The officers include John Singleton, president and manager of the Yellow Aster mine at Randsburg, Kern County, president; J. Hammond, of Searchlight district, Nev., vice-president, and F. S. Hicks, of Los Angeles, but interested in the Stringer district at Randsburg, secretary and treasurer. The executive committee is to consist of representative men from different prominent districts. The platform of the new association is to the effect that, "We thoroughly believe in the principle of equal rights to all and special privileges to none, and therefore be it resolved that we, the Desert Mine Operators' Association, declare that in the employment of labor we shall not discriminate against non-union men."

Judging from this expression it would seem that the prime object of the association was to band together the employers and operators to resist strikes among the miners. The president, Mr. Singleton, is a large owner in the Yellow Aster mine, now closed owing to strikes, and the vice-president is from a camp where they recently had a strike. An organization similar to this was formed in San Francisco recently by operators in the Mother Lode counties, but it has thus far effected very little, because its members settled affairs with their men about as they pleased and without much reference to the rules of the association. In fact, in the first contest, the miners rather got the better of it, and other strikes have since occurred, where the men got the raise of wages asked. The new association in Los Angeles covers a very wide territory, and it will be hard to get operators to "pull together" when camps are so isolated and far apart, and where the interests of various sections are so different. It will be interesting to note whether the Southern California mine operators make more of a success of their association than did their northern brethren.

MARKET CONDITIONS.

The metal markets have shown somewhat more animation this week, a number of inquiries having been received and a little more business done. This is especially noticeable in copper, in which demand seems better, buyers taking advantage of the lower prices. A large business has been done at current prices. It is noticeable that many of the inquiries for this metal are for immediate delivery, indicating that buyers are under the necessity of replenishing their stocks.

In tin there has been a sharp rise, owing to a temporary scarcity of spot metal, of which holders have taken advantage.

Lead continues scarce for early delivery. In the St. Louis market this has caused some advance in local prices. The New York quotation, however, remains unchanged, although sellers still refuse to guarantee delivery at any special date.

Spelter remains strong, with good consumptive demand, while the metal is not being pressed for sale. There does not appear to be any surplus on hand.

Silver has been rather strong on account of larger buying for the East, especially for Indian account.

The iron markets continue to show the waiting policy which has characterized them for some time past. Such concessions as have been made, instead of bringing business on a large scale, have confirmed buyers in the belief that a still further advantage can be gained by persistency in holding off. The Wall Street break has had some effect upon the market, manufacturers being inclined to hold off a little until they see whether the results of the commotion there are confined to stocks or extend to business beyond the Exchange. There have been some dealings in foundry iron, but chiefly in small lots for immediate delivery. Bessemer and basic pig have been very quiet. In finished material there have been some transactions, but none of any considerable importance. A small demand for plates has been easily satisfied, and trading in bars, merchant steel and structural material has been largely of a retail character. As we have heretofore said, most manufacturers have secured their material up to the end of September, and they are taking matters comfortably as to the last quarter of the year.

The old billet pool has been revived, the United States Steel Corporation, the Jones & Laughlin Company and a few other large concerns joining in the new agreement. It will be run something on the lines of the steel-rail pool, and is intended to govern all sales of billets and blooms to outside mills. The old pool was not an unqualified success, but it may be that its successor will do better under present conditions.

The Western coal markets continue unchanged, except that railroad transportation is in better condition, and Lake coal is being delivered at the lower ports without delay. The only trouble in the Lake trade at present is an accumulation of coal at the head of Lake Superior, where the railroads are not removing it from the docks as fast as it could be desired. Local trade continues steady, and in very good condition. In the South the strike in Alabama is in process of adjustment. The differences between miners and operators have been referred to arbitration. Judge Gray, who was chairman of the Anthracite Commission, has been requested to act as chairman of the board of arbitration. The latest news is that he has declined, but he will be urged to reconsider his decision.

At a meeting held in Pittsburg, Kan., this week, the miners and operators reached a wage agreement for one year. The settlement grants an advance of 7c. on the ton, run-of-mine; it affects the miners in Kansas, Missouri, Arkansas, and Indian Territory.

In the Atlantic seaboard bituminous trade there is a little more strength to the market, but this is due in part to poor car supply. Prices remain unchanged.

In the anthracite trade the demand has lost much of its urgency, now that many dealers and consumers have wants supplied, but the demand is still heavy enough to take the total output of the collieries. The small steam sizes are in plentiful supply, as is usual in the summer time, and the dullness in the bituminous market affects the demand for steam sizes.

A law of nature has no exceptions; the only test by which a theory can be accepted as of this rank is the successful prediction of future effects. The theory of gravitation enables astronomers to calculate the relative position of the sun, moon, planets and stars as seen from all parts of the earth's surface. This is regularly done by government offices in London, and the positions for stated times each day are published three years in advance in the nautical almanac.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

He who builds according to every man's advice will have a crooked house.

Where observation fails our reason steps in and adds greatly to our information.

If we do not reason we are bigots; if we cannot we are fools; if we dare not we are slaves.

The block of granite which was an obstacle in the pathway of the weak becomes a stepping stone in the pathway of the strong.

Common sense is the name which practical people give to the best and easiest way of doing their work, and the simplest and completest way of gaining knowledge or explaining any difficulty.

Accuracy in observation usually takes the form of correct measurement of mass, space, time, etc., by means of suitable instruments. Accuracy is always to be striven for, but it can never be attained, a fact only fully realized by scientific workers.

Science is knowledge obtained by the best method of study, and it differs from knowledge otherwise obtained in being so clear and definite that every step leading to the final result may be recalled and tested if any doubt should arise as to its trustworthiness.

Many take what they hear for granted, because they have not the information and knowledge which would enable them to form a correct judgment—others, without thinking for themselves, accept almost any theory which at first sight appears to be a good one; but opinions so gained are unreasonable and full of danger.

President Eliot, of Harvard, has said recently that "the whole store of knowledge now available is too vast for any man to master, though he had a hundred lives instead of one; and its growth in the nineteenth century was greater than in all the thirty preceding centuries put together. . . . Culture, therefore, can no longer imply a knowledge of everything—not even a little knowledge of everything. It must be content with general knowledge of some things, and a real mastery of some small portion of the human store."

Definite words are necessary for the expression of definite ideas, hence scientific terms have to be employed. A term has one definite meaning which does not change with time. The rush of affairs drifts words from their original meanings, as ships drag their anchors in a gale, but terms sheltered from common use hold to their moorings forever. The word *let*, for example, has drifted in 200 years from meaning *hinder* until now it means *permit;* but the term *bisect* has remained unaltered in significance for 20 centuries.

As careful observation is far harder work than generalization, and still harder than speculation, it is very possible that it is occasionally over-valued. It ought never to be forgotten that the observer can generalize his own observations incomparably better than anyone else. How many astronomers have labored their whole lives on observations and have not drawn a single conclusion; Herschel once remarked how much better it would be if they had paused in their devoted work and seen what they could have deduced from it.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

THE FEDERATION OF TECHNICAL SOCIETIES IN GREAT BRITAIN.

The Editor:

Sir.—My attention has been drawn to the article and letter by Mr. Edward Walker on the above subject appearing in the ENGINEERING AND MINING JOURNAL of February 14 and April 18 last, together with Mr. Bennett H. Brough's rejoinder in the issue of March 21; and I take the opportunity of offering the following remarks thereon:

One of the most successful federations of technical institutions is presented by the Institution of Mining Engineers, by which six of the mining institutes of Great Britain have combined, independent management being left to each institute, and all the papers read are published in one journal. This federation is of distinct advantage to the members of the federated societies, and the objects of its founders and of the Institution would be more fully attained if the Institution of Mining and Metallurgy were also associated with it, and the Institution of Mining Engineers included all the mining institutes, and its list of members comprised all the mining and metallurgical engineers in Great Britain.

If it be desirable that there should be "a committee representing all societies to take action where common action is desirable in the interests of the engineering profession, and to arrange for the investigation or discussion of problems that are of important interest to all branches of the profession" (page 602), surely it is desirable that all the mining and metallurgical engineers of Great Britain, India and the Colonies should be federated together as the Institution of Mining Engineers, and that the Institution of Mining and Metallurgy should no longer remain in its present isolated position, but take equal rank alongside of: The Mining Institute of Scotland; the North of England Institute of Mining and Mechanical Engineers; the Midland Institute of Mining, Civil and Mechanical Engineers; the Midland Counties Institution of Engineers; the North Staffordshire Institute of Mining and Mechanical Engineers; and the South Staffordshire & East Worcestershire Institute of Mining Engineers.

There can be no doubt that a committee comprising, say, two representatives of each of the leading scientific and learned societies would prove of great value in laying matters of interest before the Government, such as the law of copyright of scientific papers, the heavy charge entailed by the excessive rates of postage in this country, etc. Mr. Walker, however, raises a chimera when he writes of the "needless rivalry in the securing of papers to be read" (page 261), as no one has expressed the slightest desire that the Institution of Civil Engineers should devote itself entirely to papers relating to "railways, water-works, bridges and roofs, sewage, roads, etc." (page 692: the "etc." would include every subject for papers that Mr. Walker suggests should be handed over to some other learned society).

There can be no doubt that Mr. Edward Walker's articles in your JOURNAL were written in 'the interests . . . particularly of members of the Institution of Mining and Metallurgy" (page 603), and hence his suggestion that the Institution of Civil Engineers "should recognize" the Institution of Mining Engineers and "the Institution of Mining and Metallurgy as equal in rank . . . while the [Institution of] Mining Engineers would confine their energies to iron and coal and other home mining industries, and the Institution of Mining and Metallurgy would deal with gold, lead, copper and other matters of interest to the Englishman investing in mines abroad" (page 261).

It is worthy of note that Mr. Walker now feels that he gave too much area to the Institution of Mining Engineers in his first article (page 261), for in a later issue he suggests that "it would be a better policy for the Institution of Mining Engineers" . . . "to devote itself chiefly (*sic*) to subjects of interest to British coal and iron people, and for the Institution of Mining and Metallurgy to deal with silver and gold, lead, copper and allied industries at home and abroad." Possibly in his next article Mr. E. Walker will remove even "coal and iron people" from the limited area of subjects for papers that he assigns to the Institution of Mining Engineers.

M. WALTON BROWN.

Newcastle-upon-Tyne, England, July 1, 1903.

THE PROPOSED NEW TECHNICAL COLLEGE IN LONDON.

The Editor:

Sir.—In your issue of July 4 you mention briefly the proposal to found a new scientific college in London. The cabled reports, on which your paragraph was founded, were necessarily meagre; indeed all the announcements made in the English press have been vague and confused. The founders of the movement have by no means elaborated their scheme, and are not yet in a position to explain it to the public. It is only because the support of the London County Council was wanted, for the purpose of contributing part of the necessary expenses, that the scheme has been prematurely divulged. It would be better to wait until all details have been fixed before discussing the propositions or even announcing them, but as the scheme has been partly divulged, and that only by accident, it seems best to give now an outline of the intentions of the founders, so as to remove as far as possible the many misconceptions that might otherwise arise.

In the first place, it ought to be stated that the scheme is intimately associated with the proposal to found a Bessemer memorial in the shape of an extension of the Royal School of Mines, to which you alluded some months ago. By many people in England and possibly in the United States it is supposed that the two schemes are antagonistic or rivals, or at any rate that they are being brought forward by independent groups of people. To explain the position it is desirable to go into the history of the movement.

Ever since the death of Sir Henry Bessemer it has been felt that some permanent memorial should be erected to his memory. For reasons which it is not necessary now to investigate, no step was taken until the Council of the Institution of Mining and Metallurgy stepped forward and proposed that their scheme for the reorganization and extension of the Royal School of Mines might very appropriately be made into a Bessemer memorial. The Institution was not able to obtain the official support of the Iron and Steel Institute and the other technical institutions and societies in London. This they regretted, as they felt that the propositions should emanate from one of the older societies. However, on placing their proposals before influential engineers and public men, they immediately found most welcome support; still, feeling that the proposals would come more suitably from an old society, the council of the Institution approached the Society of Arts. That society took up the subject actively, and Sir William Preece, their president, became chairman of the committee. The negotiations have been most successful, and it is hoped eventually that other societies will join hands. During the discussion with leading public men it was found that there was a very strong feeling in favor of advancing the cause of higher technical education generally, in addition to the desire to enlarge the School of Mines. A separate committee was therefore formed to devise a scheme for consolidating the existing London technical colleges and for extending them by building a new college where post-graduate courses of study and research in engineering and allied subjects could be started. The two schemes have been elaborated concurrently and in perfect harmony, but necessarily by means of different organizing committees. Having thus sketched the outline of the origin of the propositions it will be of interest to enter into details of the objects of each.

The Bessemer memorial is to take the form of extensions of metallurgical study and research at the Royal School of Mines, at Birmingham and at Sheffield. In each case the extensions will not interfere with the ordinary courses in metallurgy, but will provide accommodation for post-graduate study. At the School of Mines the study of gold, silver, tin, copper, lead, etc., will be specialized, while at Sheffield, steel will be the particular study, and at Birmingham the subjects will be cast iron, wrought iron and the manufacture of alloys. The new buildings in connection with the Royal School of Mines will be located at some place outside the London boundary, so as to allow of experiments with the various metallurgical processes without let or hindrance. It is important to have it known that admission to the Bessemer laboratories will be absolutely free to students from all parts of the world, and that the majority of scholarships will be open in the same way. It is probable even that election to these scholarships will rest with an international committee.

As regards the second scheme, it is intended to consolidate the Royal School of Mines, the Royal College of Science, and the City Guilds of London Institute, and to erect a new research college of engineering where supplementary courses of study and research may be undertaken. Of this scheme it is, however, not necessary to write at any length here. It will be seen that the Bessemer Memorial forms an integral part of the consolidated technical college, but at the same time part of the memorial relates also to Birmingham and Sheffield colleges, so that the actual position of the memorial is somewhat complicated.

Some confusion also exists as to the relation of the new college to the University of London. Until recently the University was solely an examining body and provided no teaching. Two years ago additional powers were granted, so that teaching should come under the domain of the University; and University College, Kings College and the Royal College of Science and School of Mines have been affiliated to it. The connection between the university and the colleges is very slight however. It is hoped that eventually these interests will be drawn closer. When the new consolidated technical college is in working order it is intended also to bring it under the wing of the University; but such events are some way off as yet.

As regards the money required for the consolidated college, the cost of maintenance will be much greater than the $100,000 mentioned in the cable dispatch as being the contribution of the London County Council. The cost will also be borne partly by the City of London and by the British Government, and it is expected that endowment by private citizens will yield a substantial income. These details are, however, of no great interest to American readers. The most important point to readers on your side of the water is that the Bessemer laboratories and the scholarships connected with them are to be open to students from all parts of the world.

EDWARD WALKER.

London, July 14, 1903.

COMPANY REPORTS.

The Editor:

Sir.—I remember reading in the ENGINEERING AND MINING JOURNAL some years ago an article on reports of mining companies, in which those documents were grouped in three classes—reports which are intended to conceal the facts; reports which intend to give facts, but fail through faulty compilation; and, finally, honest reports, clearly made. To the three classes of companies making these reports, I would like to add a fourth—the companies

which do not make any reports at all. Of course, if one wants to go into the matter fully, these classes could be divided and subdivided; but too much classification would only obscure the matter.

Reports which are intended to conceal facts do not, as a rule, contain direct misstatements. They usually give figures, possibly correct in the totals, but so grouped that it is impossible to make any analysis of them, or to get any correct idea of the condition or operations of the company concerned. The usual plan is to group a few general figures, talk of results, and say nothing about ore mined, costs of production, or anything else which would enlighten the reader. The stockholder must take things on trust, and pocket what he can get; trusting to luck for the future. It is astonishing how many people will stand that kind of business, and even approve it, as long as they are vouchsafed something in the way of dividends. The managers may be wrecking the mine; they may be spending twice as much, in the way of costs, as their neighbors; if they can show dividends, it is all right.

The second class of reports is exasperating to the reader. As a rule it fails of its purpose through faulty arrangement, or too much detail. The facts may be all there, but the average man lacks time to dig them out, or to arrange them so that they convey some meaning to him. A little editing would do lots of good to this class.

Of the third class there is nothing to say but praise. Such reports, for instance, as those made by Mr. John Stanton, for the Atlantic and other companies under his management; by the Alaska Treadwell, and a few other companies, are a pleasure to the reader and a credit to the compilers. Would there were more of them.

Perhaps the fourth class—the companies which make no reports at all—is no worse than the first; at least there is no pretense of doing anything, and stockholders understand that they are to expect nothing. On the principle that the frankly and openly bad man is to be preferred to the hypocrite, they might be allowed to pass.

There is a principle involved, however. Directors are, in theory—not always in practice—trustees for the stockholders; and in law the trustee should always be prepared to show his accounts to *cestui qui trust*. He must be able to show what he is doing, and any concealment involves suspicion. It is true that one modern conception of a director is that he should keep the stock up in the market—and make all he can, incidentally; but that idea of his duties is hardly accepted outside of Wall Street. Now, it is practically impossible for every stockholder in a large company to consult the books personally, so the proper substitute is the periodical report, clearly stated, and submitted to the stockholders at large, as soon as possible after the year, or other period chosen, has ended. To this the stockholder has an undoubted right, if he chooses to insist upon it.

One trouble is that he does not insist as he should. Stockholders are too much inclined to let matters go, when dividends are coming; and then to demand explanations when it is too late.

A Boston man who had very large investments in railroad and copper stocks, and very good ones, too, once told the writer that he had two rules which had served him well. One was, never to buy into a company whose directors kept all the information to themselves. The second was, to "raise a row" whenever he saw signs of concealment; and to raise it before the company got into trouble, not after. The late Edgar Thomson, who, as president of the Pennsylvania Railroad Company, laid the foundations of what is now the greatest railroad structure in the world, once said—it is reported—to a director who suggested that certain information be omitted from the annual report: "I have never felt as though I ought to be in the penitentiary, and I won't begin now." That was the right spirit; we should be better off, if we found more of it now.

An instance much to the point can be found in certain Boston-owned copper companies. At the annual meeting of the Osceola last year some stockholders "raised a row," and demanded information. They were voted down for the time being, by proxies in the hands of the directors. This year, however, the company's annual report contained all the information that could be desired.

So far, I have been talking for stockholders entirely, but the possible investor—that is, the public—has some rights also; even if they are not of the positive legal kind, which the stockholder possesses. The public could enforce its claim to information, too, if it would refuse to buy into corporations of the secretive kind. However, that is too much to hope for.

The full publication of information is of advantage to engineers and managers also. The day of "trade secrets" is past. The more freely managers are supplied with information the better for them and their companies. The exchange of information is a gain to all parties; far greater than any loss which could be incurred by making facts, costs, processes or results public.

There is another point which might be mentioned. In times of depression, it is the company which is not afraid to show what it is doing, which suffers least. Its stocks may fall with the rest, but they do not fall as far. The value is known, and people are less likely to lose their heads over them. They have a certain standpoint, from which they cannot be dislodged. The shares of the secretive company, the "blind pool," on the other hand, find no bottom. Any report may be believed, for there is no ground on which to contradict it.

The lesson of all this rambling letter is that the JOURNAL, as representative of the mining industry, ought to insist upon publicity. It is in the interest of stockholders, managers and the public; rightly understood, in the interest of companies also—if they are honest.

INVESTOR.

New York, July 25, 1903.

SECONDARY ENRICHMENT.

The Editor:

Sir.—Replying to Mr. J. D. Audley-Smith's discussion, entitled "Secondary Enrichments," and published in the issue of the ENGINEERING AND MINING JOURNAL of July 11, I beg to say that I am familiar with the ores from the Humboldt mine in Clifton-Morenci district, Arizona, and the conditions Mr. Audley-Smith so forcibly presents in support of the theory of the secondary nature of chalcocite, in the case referred to, are probably the strongest arguments I can use to establish my objection.

In "the leached out vein-stuff" referred to, close examination will reveal the presence of iron oxide and minute crystals of malachite. "At the average depth of 150 ft. occur the chalcocite and iron pyrites." My experience and studies lead to the belief that the iron oxide and malachite are secondary after the primary iron pyrite and chalcocite. Mr. Calcuohoun, I think entertains the same opinion in the case quoted, and Prof. Wm. P. Blake, Territorial Geologist (Arizona), will, in his ripe and complete knowledge and experience, confirm the same.

The only instance of secondary chalcocite I have ever had fully and satisfactorily before me (and it was a most bitter experience) was the smelting of 1,000 tons of assorted copper glance ore, averaging 52.2 per cent copper, through a cupola water-jacket furnace. The campaign resulted in a product of 859 tons of really secondary chalcocite, which averaged 51.7 per cent copper.

The theory of secondary enrichments has never been satisfactory to me. From lack of early technical training I have not been able to go as comprehensively into the subject as I desired and would have liked. My experience in Arizona (and it is a local condition that has caused more mining failures than all of the mining geologists) is that the permanent (?) water level is not always the same, that in this dry region the water rises and retreats, "ebbs and flows." This periodical action continued for ages has impoverished the zone of its rise and fall, and there occurs an absence of values therein. Formerly, before this condition was recognized, when the barren zone was reached, especially so when water was at ebb, the mill or smelter was shut down, the company or individual usually failed, and the prevalent opinion that "Arizona mines do not go down" was accentuated and emphasized.

In the region of the lower water level the values begin to show in carbonated and oxidized forms, assisted probably by infiltration of surface waters carrying lime in solution, while below that point there is a heavier mineralization of the vein in the form of the redeposition of iron and copper sulphides leached from above in the zone of ebb and flow. Ores in the carbonated zone usually assayed higher in copper than the ores above, owing to the ores being much less in weight, while immediately below, for usually a short distance, the ores give a larger percentage of concentrates. These two conditions have been argued in support of the theory of secondary enrichment. Especially is this argument used when such zones of impoverishment have been lifted or moved above or away from the present zone of the rise and recession of the waters.

The ferruginous chalcocite of this section having nearly the chemical constituency (Cu Fe S) of chalcopyrite, but retaining the color and appearance of copper glance, is noticeable, particularly in veins where the matrix is glassy, brittle quartz, that oxidation begins at or near the center of the chalcocite crystal. I send you, by this mail, a specimen from the Calumet mine near here in illustration of this phenomenon. The "iron pyrite coated with chalcocite" mentioned by Messrs. Winchell and Audley-Smith from the Humboldt mine are occurrences of the interior leaching or oxidation of chalcocite, and the leached portion refilled by substitution or replacement, matasomatically, with iron pyrite, leaving a shell or coating of the original, primary chalcocite.

In contact or fissure veins, and particularly where the matrix is a clear white quartz, but less observable in bedded veins, at the time of the mineralization of these veins, whether by ascending or descending waters, or "vadose" circulation, by some mechanical or chemical condition existing at the time, minerals, noticeably chalcocite, are frequently deposited in crystals and lenticular masses of nearly pure chalcocite, as if the vein quartz had been fissured longitudinally and those fissured filled by the mineral.

Thus, probably, the occurrence noted in the Humboldt ores "in smaller concentrated fissures."

The true orthorhombic structure is often unrecognizable in masses of chalcocite tending to the amorphous, but microscopic examination generally reveals the crystallization.

It may be that the leached chalcocite—if the mineral leaches at all naturally, without previous oxidation or carbonation of its iron, and sulphur and copper contents—is re-deposited as chalcocite of the amorphous variety, such as occurred by the action of fire in the smelting campaign mentioned above.

But to date I have seen no instances noted (excepting one instance mentioned by Prof. Van Hise) that may not be reasonably explained by the hypothesis set forth in this paper.

JOHN D. BURGESS.

Tucson, Arizona, July 17, 1903.

ANNEALING OVENS.—Large annealing ovens, recently built for the Northwestern Malleable Iron Works at Milwaukee, Wis., were described in a recent issue of the *Iron Age*. These ovens are 29 ft. 6 ins. by 22 ft. 6 ins. Each holds 99 pots. The roof arch has a radius of 32 ft. 6 ins. Each oven has a grate surface of 30 sq. ft. They are operated by induced draught, under a pressure of 1⅛ ins. of water, which is supplied by a 110-in. fan directly connected with a 6 by 6-in. vertical engine.

ACROSS THE SAN JUAN MOUNTAINS.

By T. A. Rickard.

(*Continued from Page 119.*)

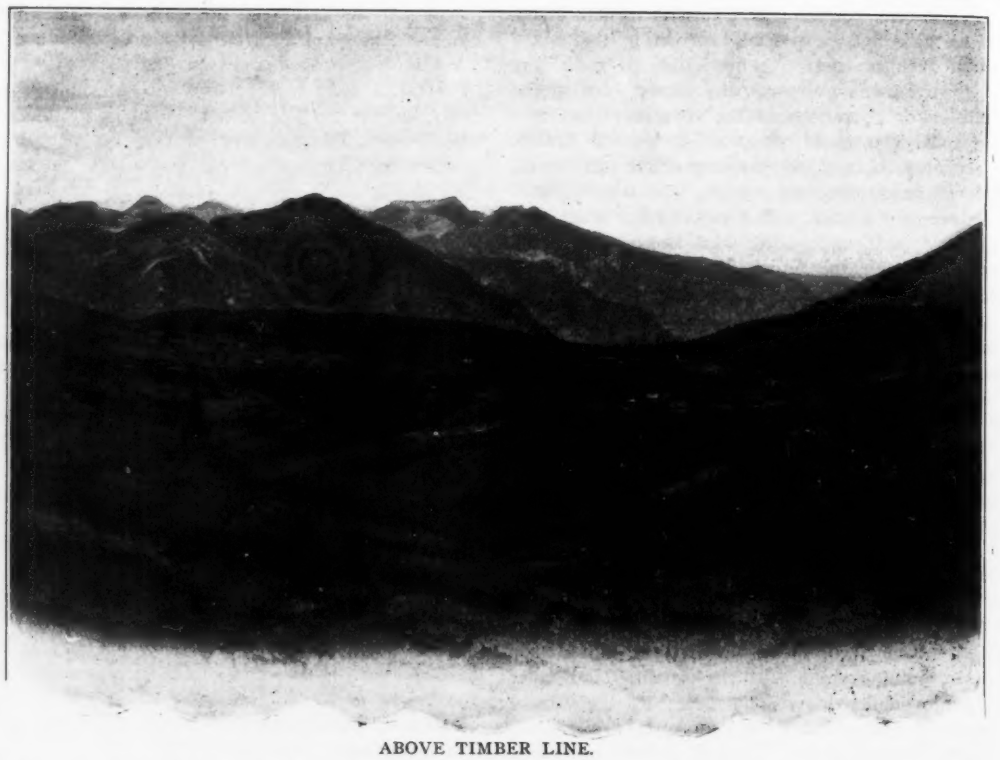
We spent two days at Telluride, visiting the mines in the vicinity. Two of our party went up to the Contention mine and avoided a long ride over road and trail by getting into one of the buckets of the tramway which makes a bee line up the mountain side. The aerial voyage was made speedily and safely, if not very comfortably. In winter the managers of many of the properties find it expedient to make their trips to the mines over the tram route and in spring, when the deadly snowslide may launch itself down the mountain at any time, it is much safer to travel on the tramway, not because it is always immune from this peril but because the shorter time to which one is exposed to danger in making the journey on the tramway, as compared to floundering painfully on horseback or toiling patiently uphill on snowshoes. The Contention is an interesting lode because it is productive of gold ore in a Tertiary conglomerate, not in the form of a bed of conglomerate impregnated with gold,[1] but a nearly vertical vein-fracture cutting through a nearly horizontal formation and passing above this conglomerate into the andesite breccia series and below the conglomerate into sandstones of the Jurassic. This is an example of the great diversity of geological environment which distinguishes the Telluride district; within a small area productive gold and silver veins have been worked not only in the Tertiary volcanics and the Tertiary conglomerate underneath them, but also in Jurassic limestone (the Sawpit mines) and in Triassic sandstone (the Alleghany). This, however, is a subject too wide for more than incidental reference.[2]

The big mines of the Telluride district afford examples of good management and the close economy which goes with such management. During the past fiscal year the Tomboy treated 85,726 tons of ore, the average yield of which was $9.98 and the average cost per ton, $5.85. With the help of the new mill, the costs are expected to be brought down to $5.50. The Liberty Bell mine, for the year ending September 30, 1902, despite snowslides and other unforeseen delays, handled 67,439 tons for a yield of $7.15 per ton, at a total working cost of $5.53 per ton; while the Smuggler-Union, on a larger tonnage, has brought the total expenses to just under $4 per ton.

In referring to good management it will not be out of place to refer to the action of the manager of the Tomboy Mine, who, when the old mine had evidently become exhausted, was enterprising enough to secure options on adjoining ground, at that time giving promise of a good thing. Mr. Herron bought the Argentine for his company and thereby put the Tomboy on its feet again. In his negotiations he was supported by his directors and the result is the possession of a mine which has made the shares of the company more valuable than at the time of its organization. Mr. Herron acted for the directors, the directors acted for the shareholders and although the transaction was a large one the shareholders were debited only with a bonus of $10,000, which was given by the company to the mine manager in recognition of his services. It is an incident worthy of record and does honor to all concerned. If managers and directors of mining companies always took such a proper view of their duties, the industry of mining would gain hugely.

TOMBOY AND ARGENTINE MINES, TELLURIDE, COLO.

In 1902 the average mining costs were $2.90 and milling expenses $0.90 for 92,917 tons. Summer costs were better than those in winter, for instance in April, 1902, the mining cost was $2.81 and the milling $0.74, for 12,979 tons. The figures for mining include expenses of ore up to delivery at dump.



ABOVE TIMBER LINE.

On the 8th of September we started for Silverton. We took the recurrent zig-zag of the Bridal Veil trail, and in an hour reached the top of the waterfall, whose filmy traceries had originated the name. The beauty of the waterfall is gone, a sacrifice to utilitarian engineering, which has taken the water to supply power to the Smuggler Union mill. The pipeline climbs to the place where once the waterfall flung itself into space, and the penstock stands where it paused for breath before its leap into the sunlit ravine. As we halted at the head of the trail, the San Miguel valley lay outspread with panoramic spaciousness.

Nearly horizontal lines of different colored rocks in ordered succession gave the suggestion of long-continued natural force building up the superstructure out of which the sculpturing hand of Time had chiselled the great array of mountain peaks which rose against the cloudless skies. Emerson has said somewhere that we ought to "respect the *naturlangsamkeit* which hardens the ruby in a million years, and works in durations in which Alps and Andes come and go as rainbows." It is restful to contemplate this patient operation of natural forces in contrast to the unresting eagerness of man—a nervous energy nowhere more marked than among the mines and mills which lie under the shadows of these very mountains. Such contemplation should conduce to equanimity. I think it does. The records of the geological societies show that geologists as a rule live long.

Above the valley rise the short slopes of red sandstones of the Trias, surmounted by the white line of the La Plata sandstone at the base of the Jurassic, and above this distinct stratum, marked by a medial layer of dark limestone, there succeed the variegated shales and sandstones of the McElmo formation at the top of the Jurassic; these, being fairly soft, have a gentle slope, partially covered by vegetation, and are topped with the gray band of the Dakota sandstone, at the base of the Cretaceous. All these rocks dip down the valley westward, so that the horizontal bedding of the over-

[1] Such as the conglomerate beds of the Witwatersrand, for example.

[2] An excellent geological report on this district has been published. "Preliminary Report on the Mining Industries of the Telluride Quadrangle, Colorado," by Chester W. Purrington, United States Geological Survey.

lying San Miguel conglomerate brings out the unconformity very clearly. This Tertiary conglomerate has a dark-red color, as seen from a distance, and it belts the base of the steep cliffs above the valley with persistent conspicuousness. It is about 400 feet thick just below Pandora, and is covered by the vast succession of volcanic ejectamenta, which rise tier upon tier for a height of 3,500 feet, culminating in serrated peaks which soar far above the uppermost limits of vegetation.

In leaving this wonderful geological section it will not be unfitting to suggest that instructors of geology in our Schools of Mines will find nowhere on the globe a better locality wherein to bring home to the student the relation between geology and mining, nor will they find, with convenience, a district which illustrates so well the working and the results of natural crosion, the operation of which Hutton and Lyell emphasized as fundamental among the processes of geological action.

When we resumed our ride, we found ourselves on a trail threading a pine forest. In sheltered spots the wild flowers of summer still lingered, and the

THE BULLION TUNNEL OF THE SMUGGLER-UNION MINE.

trail crossed busy rivulets, whose voice was the only sound disturbing the quiet of regions strangely devoid of life. Emerging from the pines, we found ourselves on the treeless waste above "timber line," and followed an easy ascent along the bare, rounded slopes at the head of an amphitheatre of ridges. It was a lifeless desolation, bleak and still, until suddenly a series of salutes rang out, to be echoed grandly from peak to peak. These were the blasts from mine-workings which we had not seen, and marked the noon hour. It was time for "croust" (literally crust), as the Cornish miners call the meal which divides their working time; so we unsaddled beside the first stream and eat our luncheon while the horses nibbled the scant, dry grass. It seemed good to be there under that serenely blue sky and amid an air that made "the world seem young and life an epic." Those who do not know the exhilaration of these high altitudes have not realized what perfect vitality means. On resuming the ascent, we were soon amid loose slopes of debris, over which the horses went with no more difficulty than ourselves, although the increased rarity of the air told on them very obviously. The trail was lost, and on choosing the lowest ridge to the south, we found ourselves eventually where we did not expect to be; that is, overlooking the little mining town of Ophir, which I knew to be out of our course to Silverton. We looked from a razor-back ridge far down a precipitously steep slope into a distant little green valley; a white road marked the centre of it, and a cluster of dwellings, like matchboxes, seen so far, marked the settlement of Ophir. This is not Solomon's treasure-house, but as the slanting sunlight touched the clusters of yellow aspens upon the lower slopes of the valley we found reason enough for the fitness of the name.

Retracing our steps into the basin, from which the ridge arose, we crossed to the eastern side, and finding a trail, ascended a crumbling ridge, from which we could see the whole complex of mountains stretching from Red Mountain to Silverton and far beyond. We were 13,200 feet above sea level. It did not take long to regain our wind, and shortly the four of us were picking a way down the further side, winding in and out of those semi-circular basins which are so characteristic of the high country just above the timber line. It was wearisome pulling unwilling horses over *talus* slopes, so we soon halted for a breathing space and took in the view. An amphitheatre of rugged peaks formed our background; tiers built up of successive extrusions of andesite looked out upon a vast lifeless desolation of gray summits and dun-colored ranges, from which rose three flaming peaks, red as torches to anarchy. These, the Red Mountains, are a land-mark throughout the region. Their color is due to the solfataric action of thermal waters upon the iron sulphides disseminated through andesitic rock.[2] At the foot of these iron-stained ridges are situated the famous Guston and Yankee Girl mines, which were so prolific about fifteen years ago. The origin of the lodes is connected with that of the peculiar red summits, in that both are traceable to the activity of acid waters which have precipitated rich silver minerals on the one hand, and, on the other hand, have removed the more soluble portions of the andesite, depositing additional silica, so that the resulting quartzose country has withstood erosion sufficiently to survive in the form of red summits, which now serve as beacons to the prospector.[3]

We reached Silverton before dark.

(*To be Continued.*)

[2] "Notes on Some Colorado Ore-Deposits," by S. F. Emmons. *Proceedings* Colorado Scientific Society, Vol. II., pp. 93-99.

THE KALGOORLIE MINES.*

By J. H. CURLE.

Developments at Kalgoorlie, West Australia, appear to keep up to the high value of the past. In Great Boulder there is good ore at 1,600 ft., and in Ivanhoe and Horseshoe the deepest workings, at about 1,000 ft., are in good ore. These three mines carry the main ore-shoots of the field. It is to be assumed that the deepest workings in Perseverance are still good, but the directors never publish anything definite; smaller shareholders may find one day that this method has its drawbacks. Oroya-Brownhill still opens up marvelously well. I classify Lake View Associated and Kalgurli as "bunchy" mines. They are all looking better than they did a year ago, and, because of big reductions in costs, are earning good profits; but neither has persistent ore-bodies, and cannot, as now defined, compare in permanency with the four first-mentioned mines. Taken all round, on their ore-reserves, the big Kalgoorlie mines, the most mines in the world, are rather over-valued, but the developments in depth seem to be as good as they ever were.

There are two unfavorable things to be noticed—firstly, the Ivanhoe put in from the Great Boulder Mine, at 1,600 ft. deep, a horizontal borehole. This, instead of cutting the three or four reefs of the series, as existing in the upper workings, cut only one reef. It is difficult to guess at what has happened here. Why should the reefs have given out? It is conceivable that the ore might have been located, carrying poor values, but not so easy to believe that strong ore-bodies should have died away altogether. Besides, two reefs of the series exist at this depth—the reef in Great Boulder and the one which the borehole did cut in Ivanhoe. I think everyone who was watching this borehole is puzzled over the matter. Down to its lowest workings—1,000 ft.—Ivanhoe has a big reserve of ore developed, or reasonably assumed to exist, and that point is still 600 ft. above the area tested by the bore. The future prospects of the mine for years to come, on known ore, are therefore so sound that I do not feel inclined to attach serious importance to the disappointing borehole.

THE CYANIDE INDUSTRY.—G. Beilby, in a paper read before the International Congress of Applied Chemistry at Berlin in June, 1903, stated that the productive capacity of works making potassium cyanide in Europe at the present time is 7,600 tons, of which 2,500 is produced in Germany, 300 in France and 4,800 in Great Britain. There is a prospective capacity of 10,700 tons, the increase being chiefly in France and Germany. In addition to the output of potassium cyanide, about 5,000 tons of sodium cyanide is made per annum. There is, therefore, a prospective capacity for the manufacture of 15,700 tons per annum of potassium and sodium cyanide in Europe. The consumptive demand for the cyanide made in Europe is not more than 5,500 tons per annum. In view of this situation, the price of cyanide is likely to be low for a considerable time. The arrangement among European manufacturers for regulating prices was disrupted last December, since which time there has been a fierce competition among them.

[3] This matter has been much discussed. See Theodore B. Comstock, "The Geology and Vein-Structure of Southwestern Colorado." *Transactions* American Institute of Mining Engineers, Vol. XV., pp. 252-264. Also S. F. Emmons, *Transactions* American Institute of Mining Engineers, Vol. XVI., p. 809, and T. B. Comstock, Vol. XVII., pp. 261-264.

*From the London *Economist*, June 27, 1903.

THE TREATMENT OF SULPHO-TELLURIDE ORES AT KALGOORLIE.

By W. A. Prichard and H. C. Hoover.

Introductory.—The Kalgoorlie field, the mines of which practically are limited to one square mile, has during the eight years since its discovery, to the end of 1902, produced gold to the value of £14,873,982. The feverish requirements of the London stock markets, into whose hands fell the development of these fabulous deposits of refractory ore, coupled with the universal inexperience in dealing with ores of this class, resulted in a number of serious blunders in metallurgical treatment.[1] There has been expended in metallurgical works on this square mile over $8,000,000, much of which has been devoted to the acquirement of experience. Some companies are now operating their second or third plants, and, on the other hand, more conservative companies continue to operate ill-adapted machinery at a high working cost or are only treating selected portions of their ore, with the use, in many cases, of unsuitable machinery such as yields them a low extraction. Some companies continue to hand-pick ores—incidentally to pick the eyes out of the mine—and ship to smelters, while awaiting the final demonstration of the best treatment process.

Although obtained at the expense of much costly experimentation and of much high priced advice, both good and bad, the treatment practice in the hands of the progressive companies to-day compares most favorably with that of any other mining center working refractory ores.

The Kalgoorlie field possesses many disadvantages, aside from its refractory ore, in the total absence of natural fresh water, in being limited as to supply of fuel, in being saddled with high freights, high import duties, high cost of living, and consequently high wages, all of which have resulted in a very high state of efficiency and ingenuity in the conservation of water, power, labor and material.

The ores are a siliceous impregnation of the country rock, itself a diabase, and therefore, aside from the state of mineralization, presents a great difficulty in the large percentage of slimes produced—both from oxidized and unoxidized material.

In the sulphide ores the gold occurs, in a minor proportion, free, but in richer ores it is intimately associated with tellurides and iron sulphides. The ore also contains considerable amounts (from 4 to 8 per cent) of iron carbonate. The percentage of tellurides, in a general way, increases toward the western part of the field and the percentage of free gold decreases.

In some mines the tellurides occur in more or less definite shoots, so that the most refractory ores can be separately treated, and in all mines the refractory character increases with the values, i. e., proportion of tellurides. The percentage of free gold varies from 10 per cent in the Oroya Brownhill to 30 per cent in the Ivanhoe, and the average contents of the ores treated varies from 15 dwt. in the Lake View to two ounces of gold in the Oroya Brownhill. The percentage of concentrates varies from 4 to 10 per cent. The perecentage of slimes in the sulphide ores varies with the mine, and of course with the character of treatment, but the inherent slimes, crushing wet through say 20-mesh screen, would probably average 50 per cent in the eastern mines and somewhat less to the west, the Ivanhoe showing a minimum.

The ores near the surface were oxidized, and in these ores the treatment, except for the heavy proportion of slimes, was a matter of no especial difficulty by ordinary milling, amalgamation and cyanide. Most of the oxidized ores have now been exhausted. The oxidation extended as far down as 200 ft.

The distinctive feature of Kalgoorlie practice is that all ores are now reduced to a slime for final treatment, but this has been developed in two general and distinctly different lines, with excellent results in both cases. First: Wet milling of the ores, concentration and roasting of concentrates and treatment of tailings by grinding to slimes the entire product and treating with cyanide or bromo-cyanide, and, second, by dry crushing, roasting the entire product, grinding to slimes and treating roasted residues by cyanide. Some other methods have been tried, but not with commercial success. The two successful processes have been applied with wide variations as to detail, owing to the unsettled state of opinion existing at the time of constructing the nuclei of the present plants.

The wet milling process is usually referred to as the "Diehl Process," and it is in use at the Oroya Brownhill, Lake View Consols and Hannan's Star mines. The other form of treatment, which usually goes by the name of the "Roasting Process," is in use on the Great Boulder Proprietary, Great Boulder Perseverance, Associated Gold mines, Kalgurli, South Kalgurli, and Great Boulder Main Reef. The Ivanhoe mine, whose output ranks fourth on the field, is not yet completely equipped for treating the whole of its ore, nor for securing the most efficient extraction. The working cost is the lowest on the field, but the work is incomplete. The Golden Horseshoe mine, whose output ranks second, is in the same position but with the highest cost. The line of development on both these mines is, however, toward wet crushing by stamps, amalgamation of free gold, concentration and incomplete treatment of tailings being secured by ordinary cyanide and filter-press treatment. In both these mines, the richest telluride ores are either mined separately or sorted, and then treated either by smelting or in a small roasting plant. Neither of these mines has yet solved *the* problem, i. e., efficient extraction.

Diehl Process.—The essential metallurgical features of this process in its best development are:

(1) Breaking in gyratory breakers.
(2) Wet crushing in stamp-mill.
(3) Concentration on Wilfley tables.
(4) Amalgamation, either on plates prior to concentration or by treating the concentrates in pans afterwards.
(5) Reduction of all tailings to a slime, in Krupp tube mills.
(6) Agitation with bromo-cyanide.
(7) Separate or combined treatment of concentrates by roasting.
(8) Filter-pressing to recover gold solution.
(9) Zinc precipitation.

In the Lake View mill, stamps of 1,100 lbs. are used, and, as prior to concentration coarse crushing is advantageous, an average duty of 5 tons (of 2,240 lbs.) is obtained. Of the product 38 per cent (slimes) will pass 150-mesh screen. If the fineness be increased to 55 per cent slime, the duty is lowered to 3½ tons, but sliming is secured more economically in the tube mills and, therefore, furnishes a second reason why the high mill duty is desirable. After concentration, the sands are separated in spitzkasten, and run into the tube mills filled with flint cobbles. From these mills, all tailings which will pass the outlet spitzkasten join the slimes from the entrance spitzkasten, and the sands return again to the tube mill. The slimes pass to closed agitators, where bromo-cyanide is introduced, the period of agitation being about 24 hours. The slimes are then introduced either by pumps or montejus to the filter-presses, for recovery of solutions, and the gold precipitated therefrom in the usual way.

The concentrates are amalgamated and then roasted in Edwards or Merton furnaces, the residues being treated by plain cyanide. For roasting concentrates but little fuel is needed, the sulphides furnishing much of the required heat. It has been found in treating concentrates that a much larger tonnage can be roasted when a considerable portion of coarse sand is included with the concentrates. The inclusion of coarse sand with the concentrates has the advantage of throwing more gold, sulphides and tellurides into the concentrates, thereby reducing more gold, sulphides and tellurides into the concentrates, thereby decreasing the consumption of cyanide and bromo-cyanide in the slimes treatment. A close concentration, though unnecessary, is very desirable in the bromo-cyanide process, and it is found, as stated above, that in practice the amount of cyanide and bromo-cyanide required to recover the gold from the tailings increases with the amount of concentrates remaining in them when the slimes are treated. The difficulty is both mechanical and chemical. There is still a further advantage where royalty is paid on gold recovered by bromo-cyanide; the cost for royalty is reduced by throwing more gold into concentrates. At the Lake View Consols over 50 per cent of gold is obtained from the concentrates.

In the case of the Oroya Brownhill, the concentrates were returned to the battery after roasting, being amalgamated prior to concentration, and considerable economy will result in introducing the Lake View method of separate treatment.

The average assay of tailings from Oroya North Block and Brownhill ore on the Oroya Brownhill for five months is 3.1 dwts. per ton, the average yield of the ore being 37.1 dwts. per ton fine gold, showing an actual extraction of 92.3 per cent per ton. The average on the Lake View Consols for the same period is 1 dwt. 14 grs., the yield being 14 dwts. 12 grs. on an extraction of 90 per cent, and in this case the irreducible minimum in tailings somewhat effects the extraction.

The Hannan's Star is an adapted mill, crushing dry in the first instance, and is, therefore, not the best development of the process, yet the extraction averages about 91 to 92 per cent.

The process is very flexible and offers many advantages in dealing with ores of different grades.

Roasting Process.—This process was developed in Australia, as the natural extension of Australian experience in various refractory ores. The essential features are:

(1) Breaking in gyratory breakers.
(2) Dry crushing in Griffin or Krupp ball mills.
(3) Roasting in Edwards' or Merton's, or other furnaces, to oxidize sulphides and tellurides.
(4) Amalgamation and sliming in pans.
(5) Separation of sands and regrinding in pans.
(6) Agitation of slimes with cyanide.
(7) Recovery of solution from slimes by filter pressing.
(8) Precipitation of gold by zinc shavings.

In dry grinding, with either Krupp ball mills or with Griffin mills, fine rock-breaking is essential, and it is usually conducted in two stages. For rock-breaking, gyratory crushers are universally favored in all processes, as the hardness and unfriability of the Kalgoolie ore makes it unsuitable for ordinary jaw crushers. In the grinding stage Krupp ball mills, Nos. 4, 5, or 8, or Griffin mills, are used. The No. 5 ball mill most commonly used, has a capacity of about 25 tons, when 66 per cent (slimes) will pass a 150 (linear) mesh screen. One Griffin mill has a capacity of about 30 tons per day, of which 70 to 80 per cent will pass a 150 screen. All dry mills work most successfully on ores containing under 3 per cent of moisture, and should much more exist, drying is necessary.

In roasting, Edwards, Merton or Holthoff-Wethey furnaces are used, and for fuel, wood; and in one case a combination of wood and coal-generated gas is used, the introduction of gas largely increasing the capacity of the furnace. The hot ore is then introduced into a mixer, where it is puddled with return solutions from the spitzkasten. The pulp then passes to the amalgamating pans or mills.

Of the gold in roasted ores, 50 per cent is recoverable by amalgamation; about the same proportion of gold as is recovered from the concentrates in the Diehl process.

The percentage of slimes is much greater in the product from dry crushers than by wet crushing, hence in the roasting process much of the sliming

[1] Admirable detailed discussion of the practice on the Great Boulder Proprietary, by Mr. G. M. Roberts, appeared in the *Monthly Report* of the Kalgoorlie Chamber of Mines for July, and of the Diehl Process by Dr. Knutzen in the *Proceedings* of the Institution of Mining and Metallurgy for 1901.

has been done prior to the second grinding operation, which in the roasting process takes place in the Wheeler type of pans. After grinding and amalgamating the remaining sands are separated by spitzkasten and clarified by spitzlüten. The sands are returned to the same or other pans for regrinding, and excess water is returned to the mixers. The slimes are led to agitation vats, where the cyanide solutions are introduced and agitation is continued for about 24 hours. The mechanical part of agitation is identical in both processes, as is filter-pressing, and is also the subsequent treatment of solutions, but in the roasting process ordinary cyanide is used. The Great Boulder Proprietary shows an extraction of about 90 per cent on ores averaging between 27 and 30 dwts. fine gold. The Great Boulder Perseverance shows an extraction of about 88 or 89 per cent on ores of similar grade.

Comparative Results.—The extraction secured by the two processes on ore of the same grade shows a difference of from 1 to 3 per cent, generally in favor of the Diehl method. However, much depends upon the efficiency of the individual plant.

In initial expenditure, the advantage lies on the side of the Diehl process, largely owing to the more limited outlay on roasting and appliances and less cost of erection.

In working expenditure the advantages on the side of the Diehl process are:

(1) Preliminary breaking in one stage.

(2) Cheaper crushing wet.

(3) By concentration the product necessary to roast is less than 5 per cent of the total ore against 100 per cent in the roasting process.

(4) Less cost of maintenance and wear and tear.

The advantages of the roasting process are:

(1) Less cost in chemicals.

(2) No royalties.

The other operations fairly well compensate each other, and it seems that the Diehl process should have, under equally efficient management, about 2½ shillings or 60 cents per ton the advantage in costs.

Working Costs.—Working costs are difficult of comparison even on so limited a field as Kalgoorlie. The factors bearing on comparative costs are not wholly the efficiency of management or the process in use. In the first instance, there is a great difference of volume in ore treated at different plants, and consequently an increased cost per ton in smaller mills from fixed charges, and decreased cost in larger mills by the range of supervision of each employee. Moreover, the hardness of the ore varies greatly, not only in different mines, but in the same mine; in general, it increases toward the southern end of the field. The consumption of chemicals varies with the richness of the ore. Besides these factors, the cost of water varies considerably; some mines obtain a portion from their own property, others are compelled to purchase all that they use.

The Oroya Brownhill and Lake View Consols mines, using the Diehl process, represent two extremes of conditions. Oroya Brownhill treats an average of about 4,000 tons per month of ore averaging over two ounces per ton, being one of the smaller mines as regard tonnage, and the richest in character of ore treated. The Lake View treats about 7,500 tons per month of an average value of about 14 dwt., this being the lowest grade sulphide ore treated. The costs include all charges except general management.

	Oroya Brownhill, shillings.	Lake View Consols, shillings.
Milling	3.38	3.61
Concentrating	1.81	2.17
Treatment of concentrates.	15.81	10.45
	21.00	16.23

For the month of May the Oroya Brownhill costs were further reduced by 1½s. or 36c. per ton, to 19½s. or $4.68.

Of mines using the roasting process, the working costs of the Great Boulder Proprietary, treating about 9,400 tons per month, and the Great Boulder Perseverance, treating between 11,000 and 12,000 tons per month, not including general management, but including superintendence of the plant, as given in their annual report for 1902, are 23s., or $5.52, for the former, and 22s., or $5.50, for the latter. Some reductions have been effected since that date, and the costs of the latter mine are given at 19½s., or $4.68 for May.

MEXICAN MINING. A RETROSPECT.

To those who are interested in mining whithin the borders of Mexico the following extract from Hubert Howe Bancroft's history will not be without interest:

The prospects of mining were full of promise, when, early in the (19th) century, a cloud overspread this and other industries, in the form of political agitation, which after ten years of warfare brought to an end Spain's domination in Mexico. The first blow for independence was struck, not at the capital, but in the region of Guanajuato, and the revolution demolished in a few years what had occupied nearly three centuries in building up. From 1814, with the exception of the districts of Catorce, Zacatecas, and Sombrerete, scientific mining was almost wholly suspended. Mining was carried on, however, after a fashion, by men of the lower classes, generally called *buscones, gambucinos,* or searchers, who to the injury of the mines worked the upper levels or spots abandoned in better times and sold the metals at low prices to wealthy men, who put it away until better times till they could carry it to the mints.

The government of the regency in 1821, after Mexico became independent, passed on February 8, 1822, a law reducing the taxes on silver and gold, and the coinage dues; quicksilver, both native and foreign was exempted from impost, and blasting powder for mining purposes was to be supplied by the government at cost and charges. These measures could not at once restore confidence, or bring back the capital which the Spaniards had carried away with them. In order to remedy the difficulties, it was decided to abandon the old Spanish law of excluding foreigners. A law was accordingly passed repealing the Spanish restrictive laws, and granting foreigners the privilege of becoming shareholders in mines, for the working of which they furnished the requisite means; but it was not permitted them to file claims either for new or old abandoned mines. No sooner had this law became known in Europe than several associations were formed, especially in England, to take advantage of the privileges thus conceded. But in the majority of the cases, from ignorance of the country, the parties exhibited a lack of judgment in their eagerness to possess themselves of mines, which in former years had been profitably worked, regardless of the actual condition at the time of making their contracts. It was during the most depressed period of the mining industry that Lucas Alaman secured the co-operation of English and French capitalists, who formed themselves into the United Mexican Mining Company, having in view mainly to renew operations in the Cata Mine, in which he was personally interested. It was but natural that such companies should turn their attention to Guanajuato. Hence the above named, and another association called the Anglo-Mexican, acquired shares in the most prominent mines of that district, particularly in the Valenciana, the draining of which by the latter was begun in 1825.

Unfortunately, the same fickleness so noticeable in former years in the general policy of the government prevailed in regard to revenue from mining—reducing the duties and imposts one day only to excessively augment them when least expected. The consequences of such instability were the repeated frauds against the treasury and the derangement of the mining industry.

After the promulgation of the Constitution of 1857, which did not confer on the general government power to legislate on mining, only two States, Hidalgo and Durango, framed a special mining code. The others merely adopted isolated measures.

The National Constitution being amended in December, 1883, the general government obtained power to issue a mining code for the whole Republic. It was so done November 22, 1884. Under this law, which went into operation on January 1, 1885, there are exempted for fifty years from its date from all direct taxation mines of coal in all its varieties, iron and quicksilver, as well as the products thereof. The transit through the interior of all mining products is made free from any impost. Quicksilver continues free from import duties and all direct taxes. Mines not of coal, iron or quicksilver are required to pay a single impost on the value of the products without deducting expenses, which are not at any time to exceed 2 per cent.

Foreigners were also placed on an equality with Mexicans in all matters pertaining to the denouncement of mining claims. Under the stimulus of these laws the mining industry went forward by leaps and bounds throughout a large part of Mexico.

A NEW METHOD OF EXTRACTING COPPER FROM ITS SULPHIDE ORES.*

By Gustave Gin.

An aqueous solution of sulphur dioxide possesses the property of attacking oxide and carbonate of copper, forming an unstable sulphite of the binoxide, which is gradually transformed into a mixture of cupro-cupric sulphite and sulphate, according to the reaction:

(1) $3CuO + 3SO_2 = 3CuSO_3$.

(2) $3CuSO_3 + CuO = Cu_2SO_3, CuSO_3 + CuSO_4$.

Cupro-cupric sulphite ($Cu_2SO_3, CuSO_3$) is only slightly soluble in water, but is easily soluble in solutions of sulphurous acid or cupric sulphate. On heating the solution to 180° C. (under a pressure of 10 kg.) it loses sulphurous acid, while cupric sulphate and metallic copper are formed:

(3) $(Cu_2SO_3 + CuSO_3) = 2Cu + CuSO_4 + SO_2$.

If the formulas 1, 2 and 3 be grouped together, it appears that the reactions correspond to

$$4CuO + 2SO_2 = 2Cu + 2CuSO_4.$$

That is, half the copper can be obtained in the metallic state and the other half in the form of sulphate.

On the above principles a new process for the treatment of copper ores has been devised. In this the ore is roasted in such a manner that the whole of the sulphide of copper is transformed into dioxide or sulphate and the whole of the iron into peroxide. Then it is lixiviated by means of a solution of sulphurous acid prepared in the ordinary manner from the fumes given off during the roasting. A saturated solution of cupro-cupric sulphite and sulphate of copper is obtained, containing at the same time a certain proportion of ferrous sulphite and sulphate. The ferric sulphite in the presence of an excess of sulphurous acid is transformed according to the reaction,

$$Fe_2O_3, SO_2 + SO_2 = FeSO_4 + FeSO_3.$$

The saturated solution of the salts of copper and iron is pumped into a copper boiler, where it is heated to 180° C., by which a pressure of 10 kg. is produced. At this temperature the sulphite and the ferrous sulphate are completely insoluble and are precipitated. The cupro-cupric sulphite is dissociated and loses two-thirds of its copper in the metallic state and at the same time sulphate of copper is formed.

The cloudy liquor is forced by its own pressure through a filter-press heated by steam circulating around the plates. In this manner a solution of sulphate of copper is obtained, which can be cemented or treated for crystallized sulphate, and a precipitate containing metallic copper, and sulphite and sulphate of the protoxide. This precipitate is washed with pure water, which becomes saturated with sulphate; the latter may be extracted by crystallization. The residual sulphite is then oxidized by moist air and gives sulphate of the protoxide, which can be eliminated by a fresh washing, and there remains finally metallic copper of great purity, which is melted and run into ingots.

*Abstract of a paper read at the Fifth International Congress of Applied Chemistry at Berlin, June, 1903.

THE SANTA EULALIA DISTRICT, MEXICO.

BY ROBERT T. HILL.

The Santa Eulalia District, 12 miles southeast of the city of Chihuahua, Mexico, is one of the best known silver mining areas in the world. It is almost synonymous with the mines of Chihuahua, that thriving city, the capital of the State of the same name, having originated with their exploitation. It is one of those historic mining camps of Mexico which have been constantly productive since the early coming of the Spaniards. Santa Eulalia is also the silver-lead camp nearest to the great smelters of the American Smelting and Refining Company, at El Paso, Texas, and is situated almost directly on the line of the Mexican Central Railway.

Two short branch lines connect the mines with the Mexican Central at Chihuahua. One of these is a broad gauge running to the village of Santa Eulalia, which moves large quantities of ore for various companies. The other is a narrow gauge belonging to the Mexican & Chihuahua Mining Company, which ascends to the mining camps and takes the ore from the dumps. The latter road has recently absorbed the former, and is now being extended to serve many other properties, besides those of the company which owns it.

Although referred to[1] by many modern mining engineers, notably Kimball, Newberry, Weed, Malcolmson and others, and although the companies in operation at Santa Eulalia have employed some of the most skillful engineers and geologists, no definite description or map of the district as it now is has been published. The writer twice visited the mines in 1901 and in 1902, and made a plane-table sketch map of the district, but the manuscript of this was lost in a railway wreck while returning home.

An excellent treatise by Dr. James P. Kimball, written some 30 years ago,[2] is the most complete and reliable technical account hitherto published. Since this report was written, however, the camp has been entirely revolutionized by the advent of railways and modern mining methods, and its value, considered great by him, has been demonstrated to be far greater than even his sanguine prophecies foretold.

History.—The history of the Santa Eulalia mining district is divisible into two distinct epochs. The first of these extends from the discovery by the Spaniards, in 1591, until the year 1882-83 when Mexico and Santa Eulalia were invaded by the steam railway. The second epoch embraces the years of the American invasion, which dates from the event mentioned. During the first of these periods the mines were only worked superficially and without mechanical appliances, the ores were smelted on the ground solely for their silver and lead contents, and the silver was minted into coin at Chihuahua. At the beginning of the seventeenth century the district reported 63 primitive reduction works with 188 smelting furnaces and 65 cupelling furnaces, while a number of similar establishments in the city of Chihuahua were also kept running on ores from this district. During the second period the mining methods were revolutionized by the introduction of machinery, which enabled the working zone of deeper and richer ores to be explored to an extent previously impossible, and the ores became additionally valuable as a flux for the great central custom smelters. Thus it became more profitable to export them than to smelt them on the ground.

From 1705 to 1737, a period of 32 years, the mountain produced an average of $2,000,000 of silver per annum, at which time there was not a single modern mechanical appliance in operation, and all the work of mining, hoisting and transportation being done by human hands. Up to the year 1791 these mines had produced silver to the value of $112,000,000.

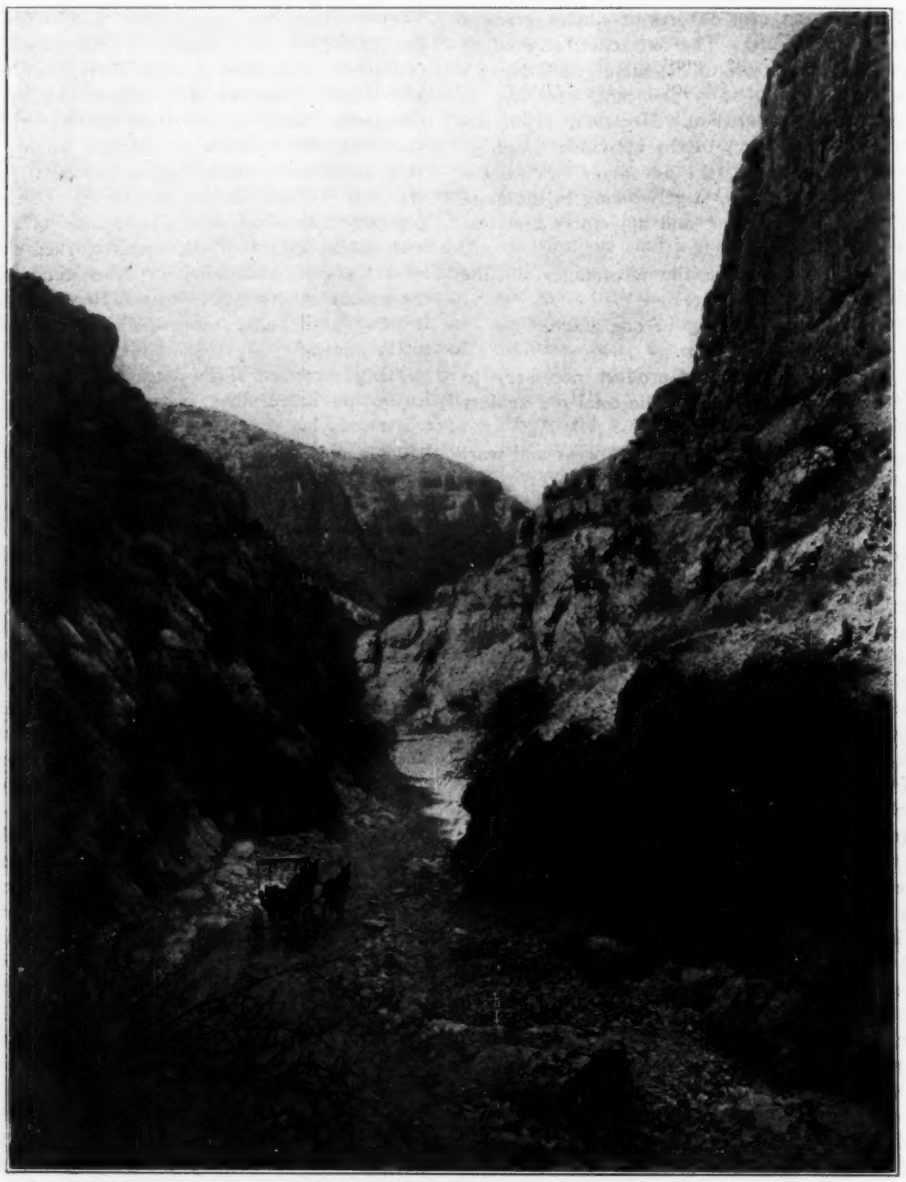
The cathedral at Chihuahua and the church at Santa Eulalia,[3] valued at $800,000 and $100,000 respectively, were built between 1717 and 1789, from a tax of 12½ cents on $8.00 of silver, indicating a product of $60,800,000, or a million dollars a year for 72 years.

The depredations of the savage Comanches, Apaches and Lipans, who made all of northern Mexico and the southern United States a ravaged waste, became so grievous that finally toward the end of the eighteenth century the district became almost abandoned.

These Indian hostilities were followed by the political troubles at the beginning of the nineteenth century, including the war with Spain, the proscription of the Spaniards and the wars with Texas and the United States. After the Spaniards were driven out a few shallow workings were continued by the Mexicans. In the year 1870, only ten blast furnaces were running with a capacity of from 25,000 to 30,000 tons of ore per day. The fuel supply (wood) was entirely exhausted, and there were then no large central smelters, or rail facilities for shipment of the ore to them, even if they had existed. Notwithstanding the depression prevailing at this time, $62,465,756 was coined at the Chihuahua Mint, between 1811 and 1895; nearly all this was from Santa Eulalia.

In the year 1882-83 the Mexican Central Railway was built along the axis of the great Mexican plateau and brought to Chihuahua the new nineteenth century civilization, with its mechanical appliances and accompanying invasion of American capital. The railway permitted the introduction of machinery whereby deeper mining was made possible. It also gave transportation for the ores to the large central smelters located along its line, and created for the ores a new value which they had not hitherto possessed, to wit, as a flux for treating the more refractory materials from other mining districts.

American capital followed the railroad into the district, gradually taking all of the available ground, buying out the old Mexican holders where possible. With the exception of one or two rich mines owned by Mexicans, all of the mountain is now practically in the hands of a few Americans, principally the Hearst estate, the Mexican and Chihuahua Mining Company (Standard Oil people), the American Smelting and Refining Company and Joseph S. Qualey.



ROAD TO MINA VIEJA, SHOWING THE ERODED LIMESTONE.

Geology.—The Santa Eulalia Mountain is an elongated *sierra* 40 or 50 miles in length, surrounded by lower desert plains. It is about 5 miles in width. Everywhere it is composed of igneous rocks (rhyolite) except within the mineral district proper, which is limited to a length of 5 or 6 miles of limestone outcrop situated at the northern end of the range.

This portion of the mountain is composed of two formations, a substructure of massive lower Cretaceous limestone (the Edwards limestone of the author), surmounted by vast accumulations of eruptive volcanic material consisting of the species of rhyolite known as dacite and locally called *cantera.* The limestone is from 2,000 to 3,000 ft. in total thickness,

[1]The mines and ores of the district have been described in many classical works, notably by Humboldt, Wizlizenius, Bartlett and Lew Wallace. Dahlgren's "Historical Mines of Mexico," 1883, pages 105-125, gives a description of the Santa Eulalia. An account of Santa Eulalia is published in *Harper's Magazine* for November, 1867, by General Lew Wallace. This is an interesting and extensive literary description of the old workings.

[2]"Silver Mines of Santa Eulalia, State of Chihuahua, Mexico." Extract from *American Journal of Sciences and Arts,* Vol. XLIX, March, 1870.

[3]See Bartlett, "Personal Narrative," page 434.

and is drab and gray-blue in color, with a firm texture like the mountain limestone of the Appalachian region and accompanied by numerous flints and fossils of the genera *requienia, rudistes, ostrea,* etc., characteristic of the Comanche Series or Lower Cretaceous. In the mineralized belt some of the highest summits are of this limestone, but they are usually buried beneath a capping of the igneous tuffs.

The dacite tuff or *cantera* which caps most of the mountain, so that the limestone is but seldom exposed, is a highly siliceous rhyolite, white upon fracture, but oxidizing to a deep brown. This material mantles most of the slopes and tops of the ridge and on the western portion of the range, in the vicinity of the village of Santa Eulalia, it is fully a thousand feet thick. The source of it is not definitely known, but my researches lead me to believe that it was properly extruded from fissure eruptions, the stocks of which are represented in the great dikes which cut the limestone strata vertically.

The limestone strata are not seriously disturbed, although they show a variety of low dips, anticlinal, quaquaversal and monoclinal; they are cut by a great fault which extends through the axis of the mountain, N. 20° W., dying out to the northward, which in some manner dominates the zone of mineralization, all the mines being located in a belt or zone adjacent to it. There are also at least three well defined lateral dikes cutting the limestone, and one mine—the San Antonio, at the south end of the property—obtains its mineral in great pockets at the contact of the dikes and the limestone. Until my visits in the last two years, it was generally considered that there were no true dikes cutting the limestone, but several of these certainly exist.

MINA VIEJA.

The Mines.—The active properties all occur in a wide zone adjacent to a line drawn N. 20° W. through the axis of the mountain, for a distance of five miles, and the producing mines are practically segregated in three groups, along this line, which might be termed the northern, central and southern groups.

The northern group includes the Mina Vieja (American Smelting and Refining Company), the Santa Rita and the Parcionera, two of which are excellent producers to-day, and have yielded marvelously in the past. These mines are at depths of 900 ft. and in excellent ore.

The central group includes the Santo Domingo, the Santa Eulalia, San Juan and the Potosi, which are thoroughly equipped and producing large quantities of ore. The shafts are down to 1,500 ft. in enormous packets of ore.

The southern group includes the San Antonio, the Aurora, the Santa Juliana and the Mercedes mines. The San Antonio Mine is the southernmost, and is a heavy producer with great quantities of ore blocked out to a depth of 1,100 ft. Like the northernmost mine of the district, the Mina Vieja, it is owned by the American Smelting and Refining Company. The existence of these two valuable and well developed mines at the extreme ends of the axis of the district, together with the valuable mines in the centre, establishes the occurrence of a well defined mineral zone throughout its length.

Mineralization.—The mineralization at Santa Eulalia is of a type frequently encountered in Mexico, but one which seems to be unfamiliar to many American miners whose practical experiences have been gained in regions where the ore-bodies occur in more distinct veins or fissures.

The mineral deposits are mostly contained in the nearly horizontal, fossiliferous Cretaceous limestone strata. The larger and greater ore-bodies thus far discovered have all been entirely in the limestone without true igneous contacts. In only one instance, however—the San Antonio Mine—have contact deposits been found, the ores of the other mines occurring solely in the limestone. Inasmuch as it was supposed that there were no ore-bearing contacts in the district, the latter have not been exploited.

There can be but little doubt that the ores have been primarily deposited as sulphides by ascending and lateral solutions, possibly derived from the deep-seated igneous rocks, the waters of which circulated through the numerous cracks, joints and bedding planes of the limestone, here and there, eating out great caverns, pipes and "chimneys" and filling them with ore.

While theoretically it may be presumed that the precious metals distantly originated from the deep-seated igneous magma, the limestone has been an important reagent in the process of precipitation, besides contributing the lime, iron and carbon elements which, combined with the metals, constitute the ores. In other words, the limestone matrix is the chief agent in causing the segregation of the ores through the process known as metasomatism or replacement, in which a chemical reaction seems to have taken place between the substances which came from the igneous magma in a state of solution and the carbonate of lime which they encountered in the strata. Thus spaces once occupied by the lime are now filled with ores. This process of replacement is here exhibited on a gigantic scale. Certain beds of the limestone seem to possess a peculiar quality favorable to the contemporaneous solution of its own substance and deposition of the metalliferous ores.

Briefly stated, the Mexican type of ore occurrence consists of irregular bodies of ore which are the result of metasomatism or replacement from solutions which have followed along inconspicuous lines of joints and fissure or bedding planes in the favorable matrix offered by the limestone.

The original ore-bodies, sulphides from the ascending solutions, have undergone great alteration from subsequent oxidation, by descending water; this has resulted in one of the chief features of the district, to wit: a zone of downward enrichment of great vertical extent, the deepest shafts (1,500 ft.) having failed as yet to reach unaltered sulphides.

The courses of ore are always marked by ferruginous stains, which, properly considered, are segregations of mineral matter, sometimes following cleavages and joints, and sometimes planes of bedding, and, again, sometimes reticulating solid beds, and in all these modes of occurrence without order or defined limits. As shown by Kimball, a bed or a number of beds, of the limestone, in places may be thoroughly webbed with such segregations of so decided a character as to impart a concretionary appearance, or as if limestone breccia were cemented by ferruginous ore. In such places the beds are not brecciated, but thus strikingly indicate the energy of disintegrating and segregating action under the decomposition of oxidation of iron salts (probably proto-carbonate) originally contained in the limestone, together with diffused salts of silver. These ferruginous portions always afford good mining ground.

The ores are mainly the chlorides, carbonates and sulphides of silver, argentiferous galena and salts of lead, together with (though of rarer occurrence) the chloro-bromide (embolite) and iodide (iodyrite) of silver. They are ferruginous and calcareous, and are frequently so friable and earthy in character as to be mined with pick and shovel. "Sand carbonates" also abound.

These ores all carry large percentages of either lead, iron, lime and sometimes manganese, or all three, which fact gives to them a far greater value than their mere silver contents would imply, inasmuch as they thereby become essential to the smelters for fluxing the more refractory sulphide and siliceous ores of other localities, and reduce the smelting charges for the silver from less than four dollars a ton to nothing—premiums paid in some instances where the ores are specially favorable.

The Ore-Bodies.—The ore-bodies are called *abras,* chimneys, pipes and *mantillas* (blankets). They are very irregular in shape, but often of tremendous size. The *abras* are small leads extending outward from the main body of ore along a small joint or fissure, which when encountered at the surface are usually followed downward until they open out into a pipe, chimney or *mantilla.* The chimneys are irregular upright bodies of ore; the pipes are horizontal circular, elongated bodies.

As some of the ore-bodies are very extensive, and as their distribution is irregular, their excavation results in large and rambling chambers, generally ranging through a number of the heavy beds of limestone. Such chambers are often continuous with natural caverns, together forming underground spaces scarcely less imposing than the most noted caves that excite the wonder of travelers in other regions.

The *mantas, mantillas* or *mantadas* are replacements along a stratum or stratum plane, making sheets or beds of ore. These are sometimes of such

tremendous size that a single one pays all the cost of the mine. One of these, at the old mine known as San José, furnished many millions of dollars to the workers.

The upper strata of the limestone are exceedingly cavernous. In nearly all of the old upper workings, caves, entirely shut off from the surface, have been encountered. Some of these are of enormous size. The great cave of the Parcionera is said to be large enough to hold the cathedral of Chihuahua. Drusy cavities or 'vugs' of all sizes, are the smaller exhibitions of the same prevailing cavernous tendency. These latter yield excellent pockets of ore. Rich *bonanzas* have been got from chambers in the walls of large caves.

The pipes and chimneys are also often of vast size, especially the latter, which seem to be irregular columns of ore sometimes hundreds of feet in diameter and descending to the bottom of the deepest workings.

The entire limestone mass of the mountain is apparently honeycombed with these bodies of ore and any deep shaft within the limestone district accompanied by intelligent cross-cutting is apt to open them up. This has been proved by many deep shafts, none of which, as yet, have resulted in failure.

Mine Development.—One of the chief features of the Santa Eulalia district is the simplicity of the mining processes now pursued.

Previous to the coming in of the Americans the mines of Santa Eulalia were worked upon the Mexican plan of following the ore. By this process vast workings in the upper reaches of the limestone were opened, presenting labarinthine mazes of unmapable chambers, caverns, squeezes, etc. Few of these openings, if any, exceeded 300 feet in depth, and were practically confined to the leaner superficial portions of the deposits. When the Mexican Central Railway was built in 1882-83, notwithstanding the vast quantities of silver which had been taken from Santa Eulalia Mountain, the deepest workings known were those of Santo Domingo, 420 ft., and the Dolores, 327 ft. deep. It is true that there were many horizontal "gophers," like the San José, 1,500 ft. in length, but absolutely nothing was known of deep mining in the modern sense.

The American mining engineers ignored the Mexican procedure of entrance by following the ore and substituted therefor vertical shafts and cross-cuts. As a result they have developed great supplies of ore, which in every instance has constantly improved in quantity and quality with depth.

The ores are mined in cross-cuts and stopes, hoisted to the dump, placed in cars and shipped directly to the smelters at El Paso, without further handling on the part of the miners. The deepest shafts are 1,500 ft., and there are several over 1,000 ft. These deep shafts have all demonstrated that the ore enriches downward, and that the water-level is at a great depth, none having as yet been encountered in the mines.

The chief features which render mining profitable in the Santa Eulalia district are: 1. The great size and number of the ore-bodies; 2. The character of the ores; 3. The ease of mining; 4. The railway facilities; 5. The absence of water in the mines, and, 6. The simplicity of plant required.

It is impossible to give figures of the production and profits of the present companies, because the companies operating having no dealings with the public, have kept their affairs to themselves, but it is a well known fact that thousands of tons have annually been shipped to the smelter of the American Smelting and Refining Company at El Paso, and that this company had paid large sums for the purchase and development of its own mines in the district. Furthermore, it is known that the Santo Domingo (Hearst Mine), the mines of the Mexican & Chihuahua Mining Company, and the mine of Pedro Gonzales, have paid enormous dividends, and that the owners are constantly improving and developing the properties.

Only partial figures of production are available. The Chihuahua Mining Company, in 1894-1895 and 1896, tried the experiment of smelting its own ores. It smelted 28,555 tons of ore, yielding 3,761 tons lead, and 529,450 oz. silver.

It may be said that ninety per cent of the silver produced in Mexico is now obtained from ores smelted in blast furnaces for lead. During the past five years 150,000 tons of ore have been shipped annually to the smelters of the Kansas City Smelting and Refining Company at El Paso, Texas. The large amount of ore exported has been derived chiefly from the Sierra Mojoda and Santa Eulalia mines.[4]

Future Prospects.—Nearly thirty years ago the distinguished mining engineer, Dr. James P. Kimball, who visited the Santa Eulalia district before the railways had been constructed, said:

"Notwithstanding the number and size of the excavations in the mining ground of Sta. Eulalia, and the large returns which these have afforded, its future prospects seem scarcely impaired by the achievements of the past. By the modern scale of mineral industry, these might pass for only a thorough exploration—in its assurances worth all that it has yielded. . . . It is not venturing too much to predict that the past record of Sta. Eulalia will be far surpassed at some future time by its development prosecuted by an enlightened practice."

When Dr. Kimball wrote the foregoing the surface of Santa Eulalia had barely been scratched, and there was not a working to any great depth upon the land. He little realized how soon American enterprise would be sinking shafts to the deeper ores and how deeper, larger and better bodies of ore would be encountered than even his roseate prophecy could predict. Most of the great amount of unbroken ground which Dr. Kimball noted as being left in the midst of the established mines, has been exploited and developed since his day, and the mineral zone extended to the southward.

CHINESE MINERS IN INDO-CHINA.

Referring to the proposed introduction of Chinese into the Transvaal, M. Pitaval, a French engineer, explains how the system works in French Indo-China. The Tonkin Coal Company three years ago began the exploitation of its mines at Haïphong with the aid of Annamite coolies, but these were not sufficient. Agents were therefore sent into the neighboring Chinese provinces to recruit, and they soon brought back with them a brigade of Chinese coolies, whose appearance was the signal for racial conflicts, which the French authorities found it difficult to control. Eventually the services of a Chinese mandarin were engaged. His duty was to deal with, and govern, his countrymen according to their own laws, except for grave crimes where French justice intervened. The Chinese soon got accustomed to working in the mines, and after a while they showed such progress and initiative that both output and wages increased generally. About 4,000 Chinese are thus employed, and they are so intelligent that they rapidly become excellent miners. They are fairly sober, do not gamble, smoke very little opium, and their morals are neither better nor worse than those of other Asiatics. They live on rice, and as this is furnished by the company, the excuse to leave the mines is taken away. Their great fault is indiscipline, and, as a rule, the only obedience they will pay is to their mandarin. "The Chinese coolie," adds M. Pitaval, "does not seek to monopolize the commerce of the country in which he lives, although his commercial aptitude is most pronounced. Although more assiduous at his work than the Annamite, the Chinaman nevertheless knocks off work fairly often, and to employ 4,000 coolies you have to count on a population of 6,000 at least, some of them bringing their wives. The conclusion is that Chinese labor, well recruited, and commanded by a Chinese chief and a European chief at the same time, is capable of rendering important services in mining work."

[4]See ENGINEERING AND MINING JOURNAL, October 24, 1901.

THE YAQUI RIVER COUNTRY OF SONORA, MEXICO.

By GEO. J. BANCROFT.

There is a good deal printed about that part of Sonora which is drained by the Yaqui river. The inaccesibility of the country and the romantic haze which shrouds all the ancient Aztec land, makes this region a fruitful field for modern journalism. Scarcely a month goes by that the newspapers do not report the details of a raid by the Yaqui Indians, and with almost equal frequency circulation is given to tales of the fabulous richness of the Yaqui river gold-fields. The Southern Pacific Railroad issued a map, not long since, which plainly showed the location of these gold-fields. One gets the impression that the Yaqui river abounds in extremely rich placer deposits, which are lying idle and neglected owing to the Yaqui war. These stories are enticing to the adventurous, and have led many restless spirits to take a long and fruitless trip.

As a matter of fact there is very little gold mining of any kind on the Yaqui river. It has always been essentially a silver mining country, and as such it has a past record of no small moment, and an outlook for the future of considerable promise. Nowadays Americans are prospecting the country for copper, as well as silver, and are meeting with some success. Out of 184 mines and prospects which were examined, only three were known as gold mines, and these were abandoned. Investigation of the placer deposits is not included in the above. My investigations were conducted in the districts of Ures, Moctezuma and Sahuaripa.

As regards the placer deposits, I had some men test what is considered one of the best bars on the river. It is located on a high flat point below the junction of the Sahuaripa and Yaqui rivers. They used a very good type of dry washer such as is used in the Altar district and not unlike the West Australian type. This bar was said to be very rich because no water could be brought on to it, and hence it retained its virgin richness. My men got about a pennyweight of very fine gold in a week of hard labor. This bar probably contained a pay-streak at one time, but it has been carried down by hand and washed at the river. Another famous bar is the Guadalupe bar, located on the Mulatos river, 1½ miles above its junction with the Arros. These two streams unite to form the Yaqui. The bar consists of about 100 acres of gravel, which is more or less gold-bearing. Mr. O. F. Shattuck, of Denver, recently made an exhaustive examination of it. The gold is extremely fine "paint gold" like that found in the sands of the Snake river in Idaho. At the lower end of the bar there are a few acres that will run 35c. to 40c. to the cubic yard, but the gravel is full of very large boulders, whose volume is not included in this estimate. The natives dig out the gravel from among the boulders and carry it to the river in rawhide sacks. There they wash it and amalgamate the gold. Mexicans are extremely skillful with their *bateas*, and no doubt they get every color in the dirt. Two men working together make about $1.00, silver value, per day together, equivalent to ¼ dwt. of gold each. It is probable that a good part of the bar has been worked over in this primitive way during past centuries, and Mr. Shattuck did not find sufficient gold-bearing material to support any sort of a business operation. I inspected another alluvial deposit near Matape, which was being worked with a patent amalgamator. The machine was saving the finest gold, but averaged only about 3c. per yard. This enterprise was subsequently abandoned. At the present time there is one placer mine not far from the Yaqui river which promises success. The Llano Colorado (red plain), lying northwest of Soyopa, has been worked as a dry placer for a long time. The Chicaros Cañon affords a very good reservoir site, so located that the water may be used on the Llano Colorado, and a dam is now being constructed for that purpose.

These four instances give a good idea of the Yaqui river placer diggings. There may be, and probably

are, some deposits which can be profitably worked by the aid of American enterprise and capital; for instance, I have heard of some dredging ground on the Yaqui and can understand that such a proposition would be beyond the native miner, but generally speaking, it is not the place for a poor man to go to, expecting to find and work his own claim.

When one considers that placer mining has been understood and practiced by the Mexicans since the time of the conquest, and that it was probably practiced by the Chicimecs, Nahuas and Yaquis at an even earlier date, and when one recalls that there have been times in the past when the slavery system was in vogue and labor counted for next to nothing, one realizes that Sonora is not a likely place to find a placer mine.

There are one or two gold-quartz mines in the watershed of the Yaqui river which have been in nearly continuous operation for a number of years. The Mulatos mine, on the river of that name, is notable among these. Such mines are, however, the exception and not the rule.

As regards the Yaqui war I think I may safely say there is no unusual danger to be feared from that source. There is a very persistent rumor that the trouble is not altogether unwelcome to the Mexican authorities, and that there has been no serious effort made to end it, because it furnishes a good excuse to maintain a standing army. The standing army, with the law and order which it enforces, has been a great boon to American operations in Mexico, and it seems a shame that an excuse should be needed to maintain it. I have no facts to prove or disprove the rumor. The fight, such as it is, concerns certain farm lands in the valley of the Yaqui, below Cumaripa. I have heard of nothing to tempt an American mining man into that particular section, and, outside of it, I doubt if there has been any real fighting. I know of several reported affairs which were entirely without foundation. For instance, the readers of the JOURNAL may recall a story which was quite widely circulated to the effect that an American was captured by the Yaquis near San Marcial, and that the Yaquis stripped him and skinned the soles of his feet and left him to get aid as best he might, I was in that neighborhood shortly afterwards, and found that nothing was known of the tale except what was read from the American papers. There was no foundation for it at all.

The Yaquis are a quiet, industrious people by nature. Their demeanor is rather sullen and unapproachable. They are one of the few tribes that have preserved their identity, pure and free from mixture with the Spanish blood; they are good miners and trustworthy servants.

The Yaqui river watershed embraces about 18,000 square miles of territory. For the most part it is a mountainous country, not a country of one dominant chain, like the Rocky Mountain region, but a country in which one little range succeeds another for about 150 miles east and west. These ranges are part of the main Cordillera system and their general trend is north and south. They attain an altitude of 3,500 to 8,500 ft. above the sea level. The mountains are rugged and abrupt; sheer precipices and pinnacle-like peaks are frequent; the scenery is very beautiful. The climate for nine months of the year, is dry and pleasant. There is a short-lived rainy season in the summer months, and in the valleys the months of August and September are uncomfortably hot. On the high plateaus and mountains the climate is pleasant the year around, and these parts are covered with long grass and shaded by small live-oak trees. The lower hills and valleys are clothed with bushes of many different varieties. There is a fever called *calentura* which is prevalent on the river bottoms; it seems to be a mild form of malaria. Taken as a whole it is not a disagreeable region for mining, and the higher altitudes are really delightful. There are not many places in the world where there is such an extensive area of pure mountain topography.

The Yaqui river does not drain all this area; the general trend of the mountain ranges is north and south, while the drainage is both east and west, toward the Atlantic as well as to the Pacific. As might be expected, the Yaqui is a very crooked stream. It has to make some very long detours to get around mountain ranges. The interior valleys were once a series of connected lakes; this was probably in Tertiary times, as is evidenced by extensive deposits of lacustrine sandstones and conglomerates belonging to this period. The connections between the lakes have been worn down below the original lake-bottoms, and are now box-cañons of rugged beauty and difficult passage. In dry seasons the Yaqui river flows about 300 cub. ft. per second and for 200 miles the average fall is 6¼ ft. per mile.

There are very few wagon-roads and practically no bridges in the Yaqui river country. Nearly all traffic is done by saddle, and in the rainy season the packers forsake the trails for a month or two.

The mountains are almost entirely composed of interbedded limestone and eruptives; there are some areas of granite, but the rock bears every evidence of being an eruptive granite. I did not make any serious effort to classify the rocks, but apparently there are large masses of rhyolite and some andesite. The granite is the lowest rock and probably the oldest eruptive. In two places small areas of red sandstone appeared surrounded by eruptive rock; I concluded that these small areas were floated fragments of the "floor" that existed at the time the eruptive were extended. The whole country has been greatly folded and faulted, and, to use a stock phrase, shows the results of great dynamic action. The last period of disturbance resulted in covering large areas with *malapai*,[1] which rests uncomfortably upon the complex beneath.

The country is seamed with innumerable quartz veins, and many of these carry gray-copper and silver in ore-shoots of varying size. There are a good many silver-lead deposits, particularly along the contacts between the eruptives and limestones, and there are some very large iron croppings which are not unlike those of the famous copper mines in northern Sonora. In fact, the whole country shows the effects of a very general mineralization. There are some coal mines at Barranca and San Marcial; they will probably be worked for local consumption only.

The silver-copper veins have been worked by the natives for generations, but comparatively few ore-bodies of any magnitude have been discovered. Most of the veins are narrow and the ore-shoots short.

The silver-lead deposits have been worked to a limited extent. The Mexicans use litharge to flux the silver-copper ores, and as the silver-lead deposits are generally low-grade in silver the natives have worked them only when they needed lead for their little smelting operations.

ON THE TRAIL.

THE YAQUI RIVER.

The native operations have been of the crudest sort. Sonora is far behind Chihuahua in this respect. I did not see anything better than a 1-horse whim or anything deeper than a 150-ft. shaft, where the enterprise was purely Mexican, and had not had the stimulating influence of a *gringo* in one way or another. The customary method of working is to hand-sort the ore to a very high-grade product, and then smelt this in a small *adobe* furnace with sufficient lead to carry off the impurities. Iron and lime are sometimes used as fluxes, but in a clumsy way. The Sonora furnace is a small reverberatory affair fitted with double hand-bellows. *Adobe* mud, cowhide and a few boards are all that is necessary to make one. The bellows are upright and the operator grasps a bellows-handle in each hand. The ordinary charge is an *arroba* and a half (about 42 lbs.) of *petanque* (clean gray-copper). Lead carbonate is preferred to galena as a flux, for it takes less time to finish a charge. In operation the first process is one of roasting, then the charge begins to melt and litharge is formed; the litharge soon fluxes everything to a molten mass, and the silver and unoxidized lead settle to the bottom, the slag is then drawn off and the process continues in the same hearth as a cupellation process. The litharge slag from this part of the process is saved for future melts. Finally nothing

[1]Literally "bad lands," from *mal* and *pais*. Throughout Arizona and Mexico it refers to the black lava flows covering the surface.

remains but a bottom of pure silver bullion, which is generally exchanged for supplies and *mezcal* at the nearest *comerciante*.

Since the railroad was built to Guaymas (charter granted September 14, 1880) it has been found cheaper to pack the ores to the railroad and sell them to the Americans; for this reason the silver-lead deposits have been almost entirely neglected of late years. Lead is not worth packing out from the mountains of Sonora.

There is a great deal of zinc throughout this region, and no attempt has ever been made to utilize it. Should it come about that any of the projected railroads are really built through this region the zinc mining industry will probably be one of its mainstays.

All through this country are large outcrops of iron oxides and of iron silicates. Many of them are stained with copper-carbonates. The outcrops of Cananea and Nacozari were somewhat similar in appearance, and this has led enterprising Americans to develop some of these outcrops. The Yaqui River Copper Company at Santo Niño, the owners of the Copper Prince, near Matape, and Mr. Frank Smith, also near Matape, are all developing copper prospects with more or less success. It is probable that others will be tempted to make similar explorations.

To understand the comparative backwardness of this country in all industrial pursuits it is necessary to look into its history.

For about 20 years the Yaquis have been more or less turbulent, and of late years the tales arising from this source have had a strong influence in retarding the investment of capital. The Yaqui river country is more inaccessible than many other parts of a generally inaccessible country. All these things have tended to retard mining, although a good deal has been done; but it has been done in a hand-to-mouth fashion, and no thought has been taken for the future. As a result most of them have been left partly filled up and in a bad condition. Rarely does one find a mine that can be thoroughly examined without doing a lot of work; frequently the shaft itself will be filled with waste, and in many cases the workings are full of water.

I have no doubt that with the influx of American capital and energy many old mines will be reopened and worked to advantage, but it must not be thought that every *antigua* can be made the basis of a profitable investment.

There are one or two very common misapprehensions about operating mines in Mexico. There is a disposition to underrate Mexican mining ability and overrate the accomplishments of modern machinery. As a matter of fact the natives work some classes of low-grade deposits at exceptionally low cost. I have sampled several mines which Mexicans were working which I am sure would have run an American company into debt. The natives often work low-grade propositions on the partnership basis, and under such conditions are content with a recompense which they would not consider if working under salary. The Trinidad mine was abandoned by an English company, but was worked successfully by the Mexicans, for 12 years, on the low-grade ore which the Englishmen left behind.

The transportation difficulties are imperfectly understood also. In our country if we need a wagon road to a mine we build it, and all who use it are glad to help keep it in repair. In Sonora the natives will use a road, and even misuse it, but they will not help keep it in repair. Several roads have been built by mining companies, but nearly all have been abandoned and the freighting is again done by pack mules.

There is an impression that Sonora is a relatively unprospected country. This is true as regards everything except the precious metals. The gatherers of the *maguay* bulbs (for the manufacture of *mezcal*) tramp every acre of mountain land at least once every three years (it requires three years for the *maguay* plant to mature). Every *mezcalero* is a born prospector, and around a *mezcal* camp there is always as fine an assortment of specimens as can be found around the average mine promoter's office. Besides these amateur prospectors there is a class of men who make a business of prospecting. So that the country has been pretty well explored, superficially, for silver and gold.

The best opportunities in the Yaqui river country are in the line of mines of copper, zinc or the rare metals, all of which have received scant attention from the Mexicans, or in the line of mines which were too wet or too rebellious for the natives to handle. New mines of gold and silver will undoubtedly be discovered also, and while many of the wild tales of great riches in the Yaqui river country are without foundation, there is every reason to believe its future production in a mineral way will compare favorably with other parts of the great southwestern part of the American continent.

CAMPO SANTO NIÑO.

BETWEEN LA COLORADA AND THE YAQUI RIVER.

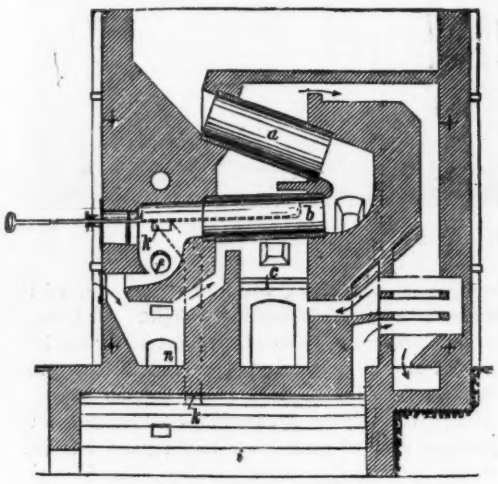
THE ASHCROFT-SWINBURNE PROCESS.

In a paper read before the Faraday Society July 1, 1903, James Swinburne described the present status of the process for treating sulphide ores, invented by him and elaborated by him in connection with E. A. Ashcroft. This process has been fully described in previous issues of this Journal; also in "The Mineral Industry," Vol. X., pp. 677-682. The novelty of the process, which receives the more consideration because of the high standing of its inventor, is such that the results of a practical application are awaited with interest. It has not yet received such an application, but the experimental work is being done on a rather large scale, which should give reliable results if properly conducted and considered. In the paper here referred to Mr. Swinburne gives few additional details, but it is interesting to note that he states that the decomposition of sulphide ore by chlorine has been effected on a large scale with perfect success, as has also been the electrolysis of molten zinc chloride. The latter is very important, since it has not previously been successfully effected, although it has been attempted by numerous investigators. Mr. Swinburne states that so far a current of 3,000 amperes has been used, but a vat with capacity for 10,000 amperes is now being tried. Above that size the current will be inconvenient. With the small vats, of 3,000 amperes capacity, four volts per cell is needed, but with 10,000 amperes, three volts should do, although in estimating it is best to count on four; however, this allowance should cover the power for the preliminary electrolysis for eliminating the oxygen of the oxychloride formed in boiling down the solution of zinc chloride. Steinhart has proposed to evaporate the solution of zinc chloride under a vacuum, in order to produce the neutral anhydrous chloride, but Ashcroft and Swinburne have not followed that method, having found that with cautious boiling down there is not much oxygen in the final result. The current efficiency in the electrolysis of the molten zinc chloride is very high. The vats are very simple, being merely iron cases lined with fire brick. The zinc chloride soaks into the porous brick and solidifies somewhere, so that it is really a vat with zinc chloride walls. The vats are internally heated, as in the case of aluminum smelting. The cathode is fused zinc and the anode is carbon. Some makes of carbon do not stand well, but suitable carbons stand permanently; chlorine has no action on the carbons. The vats are kept under a very light suction so that if there are any leaks the air goes in instead of chlorine coming out. The carbons do not become heated enough to be burned by this small admission of air. Since the vats are heated by the excess of electric power over the chemical, the larger the cell the lower the electromotive force, so that if the cell were large enough, the electromotive force might be reduced to the point corresponding to the heat of formation of zinc chloride at that tremperature. At first, great difficulty was contemplated in handling the chlorine gas, which has to be pumped into the converter under a pressure of 10 to 15 lb. per square inch. It has been found, however, that there is no difficulty in this, and that a properly designed pump will run continuously, day and night, without trouble if the chlorine be dry. The dryness of the chlorine is of vital importance.

ELECTRIC ZINC SMELTING.

As a novelty in zinc smelting, we illustrate the electric furnace designed by Carlo Casoretti and Francesco Bertani, of Milan, Italy, as shown in German patent number 129,889. In this furnace, the roasted ore, mixed with the requisite quantity of reduction material, is heated in two muffles, the heating of the second muffle being effected by electrical means. The two muffles A and B shown in the sketch set at angles with each other, one overhead, and communicate by a knee-form passage in the masonry of the furnace. They are heated from the fire place C. The charge drawn out from the lower muffle B arrives in a smelting chamber wherein it is heated by the arc between the electrodes F. The zinc vapor is conducted through the canal K into a condensation chamber I. The slag runs down into a pocket from which it is tapped off through the opening N. This furnace is presumably the one referred to in "The Mineral Industry," Volume X, page 672, wherein is stated that 1 kg. of zinc is produced per 2 h. p. hours, the quantity of coal consumed being 15 kg. per 100 kg. of ore.

In connection with the smelting of zinc ore in the electric furnace a patent recently issued to the Société Trollhättans Elektriska Kraftaktiebolag is of interest (French patent 325,895, October 21, 1902). According to this patent, pulverized ore mixed with



ELECTRIC ZINC FURNACE.

carbon, chalk, and in some cases with iron ore, is fed continuously through a pipe in the roof of an electric furnace upon a sloping wall, so that the ore in descending presents an inclined surface which receives radiation from the arc. The zinc vapor is conducted away to a condenser. The gangue of the ore fuses into a slag which flows over a step in the hearth of the furnace into a sump, whence it is drawn off through a suitably arranged tap hole.

MINERAL RESOURCES OF ALASKA.

A new division has been established in the United States Geological Survey, entitled the "Division of Alaskan Mineral Resources," which will embrace all of the investigations and surveys being carried on in Alaska. This division is co-ordinate with the others of the geologic branch of the survey and its chief will report to the Director.

For some years past extensive surveys and investigations have been systematically carried on in Alaska, the results of which have appeared in more than twenty publications of the Geological Survey, accompanied by extensive maps. These reports have been for the most part devoted to the discusion of the mineral resources of Alaska, and have proved of great practical benefit to prospectors and miners. This work is being pushed as rapidly as the appropriation will allow. The Alaskan division has now seven parties in the field, of which two are mapping and investigating the placers of the Nome region, two the gold deposits of the Yukon, another the coal-bearing rocks of the Yukon, the sixth is making a reconnaissance of the petroleum fields of Controller Bay and Cook Inlet, and the seventh is making a reconnaisance of the vein deposits of the Juneau and adjacent districts.

Mr. Alfred H. Brooks has been made chief of the new division, with the official designation of Geologist-in-charge, Division of Alaskan Mineral Resources. Mr. Brooks has been engaged in Alaskan investigations for the last six years, during which time he has made extensive journeys in the Territory. He has had administrative control of the geologic work in Alaska for the last two years, and will now combine with this the charge of the topographic work. He leaves Washington about the 20th of July for an extended tour in Alaska, and will visit a number of the important mining districts in which investigations are being carried on.

BRITISH IRON AND STEEL PRODUCTION.

The figures compiled by the British Iron Trade Association, for the production of iron and steel in 1902, have been published. They are somewhat later than usual, probably because an attempt has been made to secure a nearer approach to completness.

The supply of iron ore for the British furnaces was as follows:

	1901.	1902.		Changes.
Ore mined in Great Britain.	12,266,790	13,426,217	I.	1,159,427
Ore imported	5,548,888	6,341,272	I.	792,384
Total	17,815,678	19,767,489	I.	1,951,811

This would indicate an average consumption of 2.33 tons of ore per ton of pig made; or an average of a little under 43 per cent iron in the ore. The imported ore was higher in iron than that mined in Great Britain.

The chief source of the ore imported was Spain, from which country 5,309,733 tons were received. From Greece there were 335,824 tons; Algeria, 215,632; Italy, 182,053; Sweden, 167,083; Newfoundland, 91,617; France, 66,172; Portugal, 17,223. No other country contributed any considerable quantity.

The total imports of manganese ore were 233,333 tons, against 192,654 tons in 1901; an increase of 40,679 tons. The chief sources of these imports were: Russia, 112,706 tons; India, 43,093; Brazil, 41,986; Turkey, 12,263; Chile, 11,938; Greece, 8,322 tons.

The total production of pig iron in 1902 was 8,517,693 tons, which compares with 7,851,830 tons in 1901, showing an increase of 665,863 tons. In 1900 the output was 8,908,570 tons, and in 1899 it was 9,305,319 tons. The last figure was the highest ever reached. The British classification of iron is somewhat different from ours. We give the figures below:

	1901.	1902.		Changes.
Forge and foundry	3,597,994	3,727,294	I.	129,300
Hematite	3,267,684	3,683,148	I.	415,464
Basic	794,787	922,218	I.	127,431
Spiegel and furo	191,365	185,033	D.	6,332
Total	7,851,830	8,517,693	I.	665,863

The classification seems to be somewhat imperfect; at least, the figures do not correspond with others given by the Association. Hematite corresponds to our bessemer, or low-phosphorus pig.

The consumption and disposition of the pig iron made is estimated by the Association as in the table below. In this, imports and exports of iron and steel in all forms are reduced to their approximate equivalent in pig iron, which is taken as the general basis:

Pig iron made		8,517,000
Imported as pig		227,000
Imported in other forms		1,244,000
Total supplies		9,988,000
Exported as pig	1,103,000	
Exported in other forms	3,557,000	4,660,000
Home consumption		5,328,000

The distribution of the home consumption is estimated as follows, also reduced to terms of pig: Shipbuilding, 1,200,000 tons; merchant iron and steel, 1,108,000; foundry purposes, 1,000,000; machinery, 700,000; railroad material, 450,000; tools, hardware and the like, 450,000; tin-plates, 220,000; naval and military purposes, 200,000 tons.

The number of blast furnaces active in 1902 was 354, showing an average make of 24,061 tons each.

The statistics for wrought, or puddled, iron are not complete. The make of puddled bar was reported at 998,278 tons, against 974,385 tons in 1901, an increase of 23,893 tons. English makers have adhered to wrought iron, more than in any other country, and a large quantity of shapes and plates is made of wrought iron.

The production of steel for the year is reported as follows:

	1901.	1902.		Changes.
Bessemer	1,606,253	1,825,779	I.	219,526
Open-hearth	3,290,791	3,083,288	D.	207,503
Total	4,897,044	4,909,067	I.	12,023

For the first time in several years the figures show an increase in the proportion of bessemer steel. The bessemer, or converter, metal was largely used for rails, of which 903,216 tons were made last year.

The division according to the processes used was as follows, last year:

	Acid.	Basic.	Totals.
Bessemer (converter)	1,157,180	668,599	1,825,779
Open-hearth	2,676,508	406,780	3,083,288
Total	3,833,688	1,075,379	4,909,067

The basic process showed a gain last year, though three-quarters of the steel made in Great Britain last year was acid steel. The small increase in the total steel production last year is a notable point. It indicates, probably, that a larger proportion of pig iron than usual was exported.

THE COEUR D'ALENE MINES.

BY OUR SPECIAL CORRESPONDENT.

The returns made by the silver-lead mining companies in the Coeur d'Alene district to the county assessors have now been filed. Under the new tax law of Idaho mine managers are required to file sworn statements showing ore mined, expenses and net profits. The tax is levied on the net returns. The figures, of course, are general, but they present the only statement obtainable for some of the mines; and they are therefore given, as presenting some points of interest:

The following table shows the production of the Coeur d'Alene mines for the year 1902:

PRODUCTION OF COEUR D'ALENE MINES.

Mine.	Gross tons.	Gross value.	Cost extraction.	Cost freight reduction.	Cost repairs construction.	Net profit.	Net loss.
Bunker Hill & Sullivan	34,109	$1,673,592	$816,365	$747,662	$41,674	$67,891	.....
Coeur d'Alene Development Co.	23,077	465,017	130,176	184,288	7,482	143,070	.....
Cleveland—R. Wilson	2,534	32,448	8,826	11,014	.....	12,607	.....
Empire State—Wardner	147,009	1,081,625	363,775	430,460	7,692	279,698	.....
Empire State—Burke	115,500	548,516	315,037	213,538	12,933	7,007	.....
Frisco Consolidated	18,858	75,144	100,794	33,062	5,986	.....	$64,097
Gold Hunter	36,397	185,558	118,865	62,691	8,807	.....	5,076
Golden Chest	8,643	48,643	28,540	4,480	9,742	5,880	.....
Hercules	4,998	394,629	65,900	140,330	18,863	169,527	.....
Mammoth	74,994	921,611	257,948	283,068	33,308	347,386	.....
Morning	209,852	973,950	352,514	479,649	30,732	111,054	.....
Hecla	45,911	401,730	401,730	151,908	16,789	45,048	.....
Standard	155,525	1,321,977	513,434	497,060	39,855	271,626	.....
Totals	877,407	$8,125,043	$3,473,907	$3,239,486	$233,864	$1,460,696	$69,174

The total net profit shown was $1,391,522. The average return, taking all the mines, was $9.26 per ton; the expenses $7.67, and the net return $1.59 per ton mined.

Certain by-products of the steel industry may prove to have medicinal value. If the hopes of German chemists are realized, rheumatism will be cured by the water used in granulating blast-furnace slag for making cement.

REVERBERATORY FURNACES FOR SMELTING COPPER.*

BY E. P. MATHEWSON.

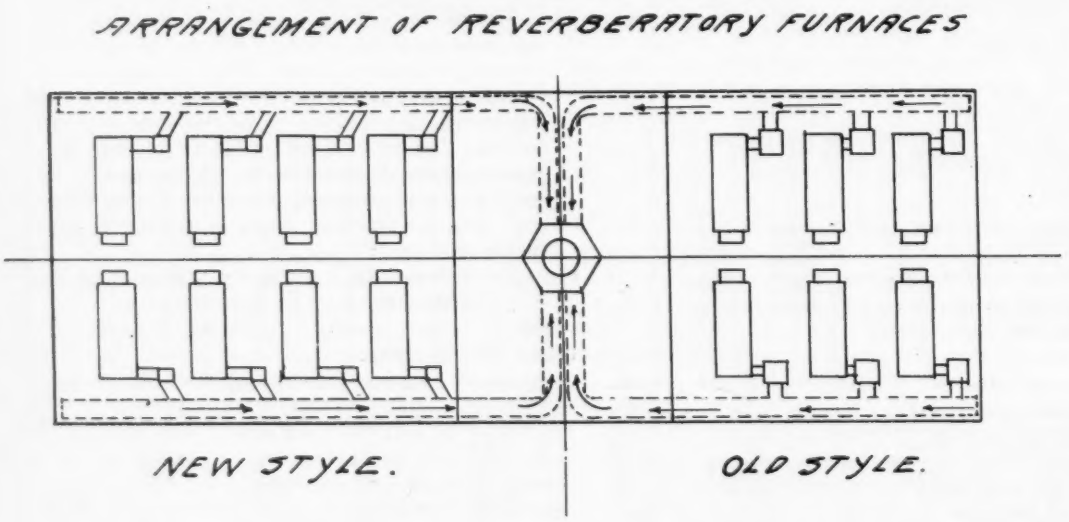
Probably the largest installation of reverberatory furnaces built in recent years for the smelting of copper is that of the Washoe Copper Co., at Anaconda, Mont. The plant consists of 14 furnaces, originally 20x50 ft. hearth measurement, set back to back in two rows and housed in two steel buildings substantially built and well ventilated. Between these buildings is a chimney 225 ft. high, 20 ft. internal diameter, constructed of steel and lined with brick, the connections to the furnaces being made by four main flues. One feature of the original construction was an arrangement for pre-heating the air by the heat of the escaping gases and the heat radiated from the bottom of the hearth. The air was admitted first to a brick chamber built around the brick-lined steel pipe, which carried the waste gases to the main flue; thence the partially heated air passed beneath the bottom of the furnace in a narrow channel, passing from the front to the back four times before rising in a cast iron box to the top of the furnace; thence to a sheet steel box above the bridge wall, being finally admitted to mix with the gases from the fire box, through checker work in the roof above the bridge wall, the draft of the furnace being sufficient to draw in the hot air. In remodeling the furnaces this arrangement was omitted, as it was considered more important to retain the heat in the bottom of the furnaces than to use it for pre-heating the air furnished to the top of the charge, more rapid smelting being accomplished by keeping the matte in the furnace as hot as possible.

In building the plant, every convenience to facilitate the handling of materials was arranged for. The ashes from ash pits are sluiced away by waste water from the concentrating department, and the slags are granulated and washed away to the dump by the same means. The matte is tapped from time to time into large ladles holding 11 tons and drawn by compressed air locomotives to the converting department, where the still molten matte is dumped from ladle to converter to be blown to copper. The air necessary for the combustion of the fuel was forced under the grates by fans, the ash pit being closed by cast iron doors. Each furnace had an average daily smelting capacity of 100 tons of calcines. The fuel used was obtained from Diamondville, Wyo., and consisted of "run-of-mine" coal of the following composition: Water, 1.6 per cent.; volatile combustible, 38.7; fixed carbon, 49.2, and ash, 10.5 per cent. This coal gives very satisfactory results under natural draft, but with forced draft it does not act so well.

In the former practice the time lost in grating the furnace averaged three hours per day per furnace, and during the grating (which occupied one-half hour at a time) the front of the furnace became cooled and the slag frequently set near the skimming-door. At the suggestion of Capt. W. M. Kelly, Furnace No. 9 was remodeled on the lines of the best furnace at the old Anaconda works, and an extra large fire-box was constructed in order to give every chance possible for the furnace to work without forced draft. The grates were ordinary bar iron with open ash pit. The flues were changed to permit of a more direct connection without sharp bends, and the down-takes for escaping gases were enlarged. The results obtained in the modified furnace were excellent at the start, and the good record has been satisfactorily maintained.

In consequence of the improvements in furnace No. 9, the other furnaces were altered accordingly, and the working under the new conditions made a very excellent showing, as set forth by the following data: Average tonnage of calcines treated per furnace per day was: January, 1903, 106.6; February, 115.7 tons; March, 123.84 tons, and April, 133.53 tons. The fuel consumption averaged one ton of coal to three tons of calcines treated, and it may be stated that this good average will be still further improved. The total supply of coal delivered to the plant is charged up as weighed, and during the months under review (January to May, 1903) much of this coal was consumed in starting up new furnaces and in tapping out old ones. The best record for fuel consumption yet obtained on a single furnace is 1 ton of coal to 4.07 tons of calcines, the output of the furnace being 171 tons. Under the present conditions the furnaces carry an even heat, and no time is lost in grating. The materials sent to the furnaces are carefully weighed in charge cars (20 tons to the charge), which are again weighed when empty each trip. The weighing and tramming are done by a set of men entirely separate from the furnace crew and under a separate foreman. The coal weights are checked monthly by the railroad car weights and check within 1.5 per cent. of the latter—the variation being over-weight. All material for the furnaces is handled by compressed air locomotives, and is loaded in hopper-bottom cars which discharge into the hoppers above the furnaces.

SIDE VIEW OF FURNACE, SHOWING SLAG LAUNDER.



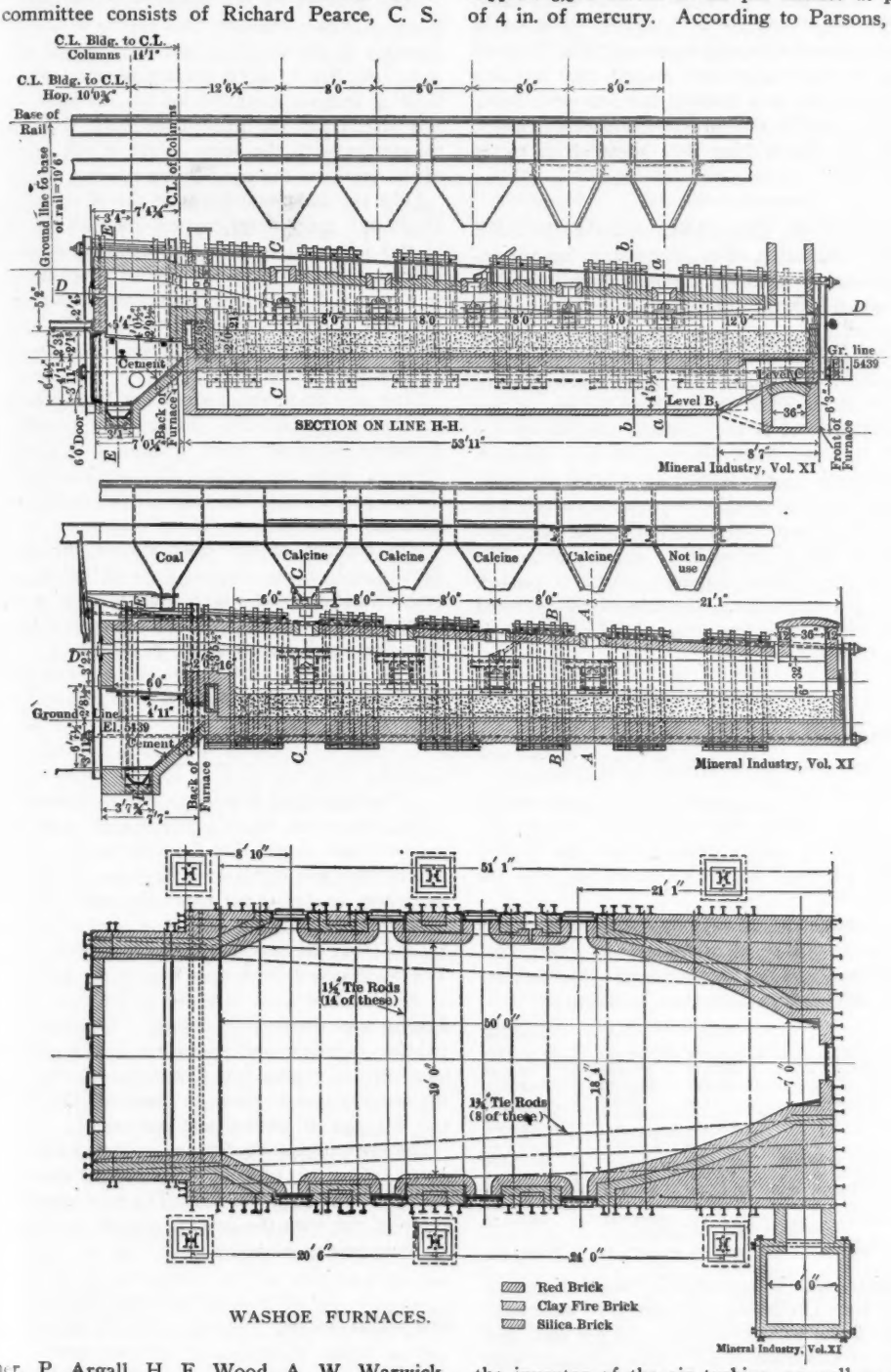
Under the improved conditions of working, the aggregate cost of coal, labor and repairs has been reduced by more than $1,000 per day. The following details of furnace operations are of interest: Draft in down-take = 1.5 in. of water. Analysis of material charged: Cu, 10.5 per cent; SiO_2, 33.2; FeO, 39.5, and S, 7.8 per cent. Analysis of slag produced: Cu, 0.39 per cent; SiO_2, 41.4; FeO, 45.8, and CaO, 3.1 per cent. Copper content of matte produced 47.44 per cent.

During March, 1903, three of the old-style furnaces were still in operation, which reduced the average tonnage. The modified furnace treated on the average 135 tons of calcines per day, and each of the old furnaces when remodeled will have a capacity of 140 tons per day, with fuel consumption of 1 ton of coal to 3.5 tons of calcines smelted. Another important change now being installed is the placing of a 300-h. p. Stirling boiler between each reverberatory furnace and the main flue, the idea being to utilize the waste heat of the gases escaping from the furnaces. These boilers had been tried once before at the plant, but they were then installed in the same manner as for direct coal firing, and although the boilers themselves made excellent records, the output of the furnaces to which they were attached fell 20 per cent. below those that had no boilers. In the new setting, the idea has been to give free passage through the boiler, and ample down-take beyond, in order to facilitate the escape of gases as much as possible. Furnace No. 11, which was arranged in this manner, has given excellent results, the draft on each side of the boiler corresponding to 1.6 in. of water. The temperature of the gases at the inlet of the boiler was 2,380° F., while at the outlet it was 1,100° F. Allowing 345.5 lb. of water per horse-power-hour from and at 212° F., and feeding the water at 47.2° F., the boiler tested 340 h.p.,

*From advance sheets of "The Mineral Industry," Vol. XI., now in press.

which corresponded to a saving in coal alone of $10 per boiler per day. The steam pressure was 155.7 lb. on an average.

VOLUMETRIC LEAD ASSAY.—In reference to the investigation of methods of zinc assay by the Society of Chemical Industry, New York section, recently mentioned in these columns, it will be of interest to our readers to state that a committee has been appointed by the Colorado Scientific Society to report upon the adaptability and limitations of volumetric lead determinations for commercial work. This committee consists of Richard Pearce, C. S. Palmer, P. Argall, H. E. Wood, A. W. Warwick, E. C. Woodward and E. N. Hawkins.



WASHOE FURNACES.

TURBINE AIR COMPRESSORS.—The large prospective application of turbine engines is the most remarkable of the recent developments of steam engineering. The General Electric Company is preparing to build them on a very extensive scale, and we understand has orders for many hundred thousand horse-power already on its books. This is only one of the concerns that is entering the new field. An important new feature in connection with the turbine principle is the discovery that it may be used in the construction of air compressors with results as to efficiency which compare favorably with those of the steam turbine. The air turbine is designed in about the same way as the steam turbine. On a prolongation of the shaft of the latter a series of moving blades is fixed alternately with rings of stationary blades which extend inwardly from the walls of the cylinder. The action of the air turbine is the reverse of that of the steam turbine. The first ring of blades forces the air forward at a low pressure, and each succeeding ring increasing the pressure until at the exit it issues in a continuous steady blast at the designed pressure. At a lead smelting works on the Tyne, England, an air turbine supplies 3,500 cu. ft. of air per minute at pressure of 4 in. of mercury. According to Parsons, who is the inventor of the air turbine, as well as the best known steam turbine, the capacity of the furnaces was increased 30 per cent after the adoption of the new system, which he attributes to the increased steadiness of blast. At this plant the air turbine is not driven by a directly connected steam turbine, but by an electric motor. At Johannesburg a turbine, high-pressure, two-stage air compressor is now being erected, which is designed for a delivery of 4,000 cu. ft. of air per minute at 80 lb. pressure. All the advantages as to economy of space and power, convenience, and low cost of repairs are said to be shown by the air turbine as by the steam turbine. The possibilities of this new development are far reaching. It is especially interesting to make note that the first industrial applications are being made in the field of mining and metallurgical engineering.

MATTE SMELTING.

At the meeting of the International Congress for Applied Chemistry at Berlin June 2-8, 1903, Professor C. Schiffner, of Freiberg, read a paper on pyritic smelting, in which he described the new process of E. Knudson. In the Knudson process sulphide ores are smelted with a consumption of only 1 per cent coke in a converter, a matte with 45 to 50 per cent copper produced. The converter is lined with magnesia brick. At the beginning of the blow the wind pressure is about 0.25 atmospheres; at the end, somewhat in excess of one atmosphere. There is formed a mixture of matte and slag, the latter gradually separating from the matte, which, on its part, is gradually enriched in copper by oxidation of its iron contents. The progress of the operation is governed by the appearance of the flame. Upon completion the matte is tapped into a second converter, in which it is blown to black copper. With a charge of 7,000 kg. the first process occupies 4.5 hours. The cost is said to be very low. Otherwise, the advantages of the process are considered to be the compactness of the furnace, in which the heat is developed in a small space and uninterrupted operation is rendered possible. A high temperature is attained, it being easy to bring the smelt up to white heat, which makes the slag very fluid. The area of the tuyere openings stands in proportion to the cross-sectional area of the furnace at the tuyeres as 1:100.

AN IMPROVEMENT IN BRASS FOUNDING.

W. Lynes, of Birmingham, England, has made an important improvement in the practice of brass casting, which obviates trouble from the fumes of zinc, dangerous both to the health of the casters and the character of their work, which are given off when the molten metal is being poured. By the new method the caster puts a hood, or lid, on the mouth of the pot when he takes it from the furnace, and after setting it on a ring, so as to get the correct position, attaches to it a long length of flexible tubing, which communicates with a galvanized iron pipe leading outside the casting house. For skimming the metal a special trough is hung on the pot in front of the pouring hole in the hood. One-half of this trough is fitted with a shield made of wire gauze, and the fumes escaping from the metal are deflected during the skimming, by means of this shield, into the exhaust pipe. After the skimming a plain, tightly fitting cover is put on the pot, which is then taken to the molds for pouring, no fumes escaping during that operation. The new method is said to enable the casting to be done in less time than the old method, the caster being able to work comfortably in a clear atmosphere, while its introduction on hygienic grounds is highly recommended by the government factory inspector. As an incidental advantage, there is the possibility of collecting the fumes of zinc white by means of a simple condensing system.

RADIUM.—A curious radium phenomenon is reported by M. E. Fournier d'Albe in the *Electrician*. Mr. E. Dorn enclosed 30 milligrammes of Buchler's strongest radium bromide in a tube of Jena glass free from alkali and 6 cm. long. This was done last December. At the end of May he wanted to open the tube. Just as he was applying a three-cornered file, and had only slightly scratched the surface, the glass was pierced by an electric spark with an audible noise. The phenomenon may be explained by supposing that the negative electrons had escaped through the walls of the tube, which were 0.3 mm. thick, and a positive charge remained. Negative ions would then accumulate on the outer surface of the tube, and this accumulation would be facilitated by the ionization of the air around. Since the author held the tube in his left hand and the file in his right, the discharge was rendered possible.

PIG IRON PRODUCTION IN THE UNITED STATES.

The American Iron and Steel Association has received from the manufacturers complete statistics of the production of all kinds of pig iron in the United States in the first half of 1903; also complete statistics of the stocks of pig iron which were on hand and for sale on June 30, 1903.

The production of pig iron in the first half of 1903 was 9,707,367 gross tons, against 8,808,574 tons in the first half of 1902 and 9,012,733 tons in the second half of 1902. The increase in production in the first half of 1903 over the second half of 1902 was 694,634 tons. The united production of the second half of 1902 and the first half of 1903 amounted to 18,720,100 tons.

The production, as classified by the Association, was as follows in the first half of this year, comparison being made with the first half of 1902:

	1902. Tons.	1902. Per ct.	1903. Tons.	1903. Per ct.
Foundry and forge irons	2,530,386	28.7	2,912,270	30.0
Bessemer pig	5,105,932	58.0	5,480,619	56.5
Basic pig	1,053,274	11.9	1,203,803	12.4
Spiegeleisen and feromanganese	118,982	1.4	110,675	1.1
Totals	8,808,574	100.0	9,707,367	100.0

Included in bessemer pig is a production 89,723 tons of low-phosphorous iron, intended for use in the open-hearth furnace. The changes, as compared with the first half of 1902, were as follows:

		Tons.	Per ct.
Foundry and forge irons	I.	381,884	I. 1.3
Bessemer pig	I.	374,687	D. 1.5
Basic pig	I.	150,529	I. 0.5
Spiegeleisen and ferromanganese	D.	8,307	D. 0.3
Total	I.	898,793	...

The production, classified according to fuel used was as follows for the first half of the current year:

	Tons.	Per ct.
Bituminous and coke (chiefly coke)	8,401,001	86.6
Mixed anthracite and coke	1,046,461	10.7
Anthracite alone	26,261	0.3
Mixed charcoal and coke	927	...
Charcoal	232,717	2.4
Totals	9,707,367	100.0

The production by States is given as follows:

	1902. First half.	1902. Second half.	1903. First half.
Massachusetts	1,716	1,644	1,419
Connecticut	5,278	6,808	7,142
New York	186,523	214,846	270,443
New Jersey	105,295	86,085	106,387
Pennsylvania	4,045,965	4,071,835	4,498,038
Maryland	148,619	154,610	166,801
Virginia	263,233	273,983	322,529
N. Georgia and Georgia	12,401	19,914	34,001
Alabama	700,546	771,665	777,870
Texas	1,528	1,567	5,023
West Virginia	93,297	89,708	106,970
Kentucky	51,089	59,636	53,034
Tennessee	187,359	205,419	227,259
Ohio	1,775,496	1,855,892	1,860,334
Illinois	879,800	850,420	838,655
Michigan	85,661	69,552	111,953
Wisconsin and Minnesota	131,531	142,456	157,241
Missouri, Colorado, Oregon and Washington	133,237	136,693	162,268
Total	8,808,574	9,012,733	9,707,367

The whole number of furnaces in blast on June 30, 1903, was 320, against 307 on December 31, 1902, and 286 on June 30, 1902. The number idle on June 30, 1903, was 101. Of the active furnaces on June 30, 1903, 226 used bituminous fuel, 53 used anthracite coal and coke mixed, 4 used anthracite coal alone, and 37 used charcoal alone.

Our statistics of unsold stocks do not include pig iron sold and not removed from the furnace bank, or pig iron manufactured by rolling-mill owners for their own use, or pig iron in the hands of consumers. The stocks which were unsold in the hands of manufacturers or their agents on June 30, 1903, amounted to 126,301 tons against 49,951 tons on December 31, 1902, and 30,861 tons on June 30, 1902, the latter figures including 1,000 tons in the yards of the American Pig Iron Storage Warrant Company which the manufacturers did not control. No pig iron was stored in the yards of this company on June 30, 1903, or on December 31, 1902.

On June 30 there were 32 blast furnaces in course of erection in the United States, of which 30 will use coke for fuel when completed and 2 will use anthracite coal and coke mixed. These furnaces are located in the following States: New York, 6 coke; New Jersey, 1 anthracite and coke; Pennsylvania, 10, of which 1 in the Lehigh Valley will use anthracite and coke, and 2 in Allegheny county, 3 in Shenango Valley, and 4 in other counties in Western Pennsylvania will use coke exclusively; Virginia, 1 coke; Alabama, 6 coke; Ohio, 5 coke, 1 at Youngstown, 2 at Lorain, 1 at Cleveland, and 1 at Steubenville; Illinois, 1 coke; Michigan, 1 coke; and Colorado, 1 coke. About one-half of these furnaces will be completed and blown in before the close of 1903, but the remainder will not be ready for blast until 1904 or 1905. In addition to the new furnaces enumerated above, one coke furnace in Virginia, upon which work was suspended several years ago, is to be completed in the near future and several coke furnaces are projected. No new charcoal furnaces were being built on June 30, but several charcoal furnaces which had been idle for a long time were about to be revived.

EXTRACTION OF ZINC FROM BURNT PYRITES.—A. Gasch, of Muenchen-Ost, has patented the following process (German Patent 142,943, September 21, 1899): Burned pyrites, containing zinc, is ground to 1 or 2 mm. size and mixed with a quantity of sulphuric acid of 60° B. corresponding theoretically to the zinc content of the material, after which it is permitted to lie in a heap for one or two days. The product is then roasted for five or six hours at dark red heat, after which it is leached. In this way the zinc is extracted so that not more than 1 per cent remains in the residue, which will have a sulphur content of less than 0.5 per cent, and consequently will be valuable as an iron ore. The capacity of the roasting furnaces is nearly doubled, saving in coal and labor. The use of concentrated sulphuric acid is important, since thereby the iron is only slightly attacked.

ABSTRACTS OF OFFICIAL REPORTS.

Calumet & Hecla Mining Company.

The report of this company for the year ending April 30, 1903, supplies little information beyond the bare statement of copper produced and the balance sheet. The earnings and expenses for the year are not stated.

The product during the year was 38,316 tons refined copper, against 39,982 tons in the previous year; a decrease of 1,666 tons, or 4.2 per cent. The balance sheets for two years past compare as follows:

	1902.	1903.	Changes.
Cash and copper on hand	$3,950,575	$6,118,436	I. $2,167,861
Bills receivable	366,658	509,584	I. 142,926
Insurance fund	149,937	600,276	I. 450,339
Employees' aid fund	.....	6,583	I. 6,583
Total assets	$4,467,170	$7,234,879	I. $2,767,709
Drafts and bills payable	$485,287	$373,681	D. $111,606
Employees' aid fund	17,529	.....	D. 17,529
Machinery contracts, etc.	371,575	304,174	D. 67,401
Total liabilities	$874,391	$677,855	D. $196,536
Balance of assets	$3,592,779	$6,557,024	I. $2,964,245

The capital stock is $2,500,000 in 100,000 shares of $25 par value. Dividends paid last year were four of $5 each, being $20 per share, or 80 per cent, and amounting to $2,000,000 in all. This compares with $4,000,000 in the previous year.

The report of President Agassiz says: "During the past year we produced mineral equal to 42,216 tons of refined copper as against 42,462 tons last year. Our product in refined copper was 38,316 tons. For the previous year our product in refined copper was 39,982 tons. The price of copper has varied from 11¼ to 15½c. per pound, and is now about 15c. There have been paid during the past fiscal year four dividends of $5 each.

"The character of the new openings on the conglomerate belt tributary to the Red Jacket shaft has, as in former years, been unsatisfactory. We are preparing to sink a slope on the 57th level, to work the northern part of the mine known as the 'five forties.' The northerly trend of the southern extremity of our copper-bearing ground has gradually forced our workings to the north; they are now beyond No. 11 Hecla shaft.

"We are installing underground the pockets planned to serve the Kimberley skips now building to replace the cage and car system in use for hoisting at the Red Jacket shaft. This we hope to have in commission by the close of navigation. The pockets have a capacity of 9 tons. Our railroad tracks are connected with those of the Copper Range Railroad, to which we have leased depot grounds on the outskirts of Red Jacket village.

"The position of the breakers in our shaft rock houses has been changed; this results in considerable economy in the breaking and handling of the mine rock. At No. 13 shaft we are erecting one of the hoisting engines designed for the Amygdaloid belt. We intend for the present to work this plant in connection with the mine work at the north end of the mine on the conglomerate lode.

"The six additional heads in the extension of the Hecla mill are now in commission. The equipment of this new mill is most satisfactory. It shows an important reduction in the cost of stamping as well as a material saving in the tailings from the mill. We have planned to equip both our mills according to this new system; without unusual delays we should remodel four heads annually.

"The new 60-ft. sand wheel has been erected and is running satisfactorily. Its capacity is sufficient to distribute the waste from 18 heads to a distance of 2,800 ft. from the mills. The machinery for the electric power house has been erected and is in commission.

"On account of the condition of the water at Torch Lake and its effect on the mill boilers we have been obliged to erect a large filter plant of a capacity of 500,000 gals. The filter has apparently remedied a trouble which threatened to be serious.

"The expenditures for the Aid Fund during the fiscal year amounted to $65,123. The value of the Aid Fund at cost is $112,122."

Portland Gold Mining Company, Colorado.

The report of this Cripple Creek company for the year 1902 shows that the total production of ore for the year was 89,664 tons, having a gross value of $2,334,024, or $26.03 per ton. The total quantity of rock from all stoping and development work was 311,854 tons, the average cost being $3.13 per ton. The development work done was 15,174 ft. The cost of development work is given as $161,301, of which $38,704 was charged to stoping. The cost of new cribbing buildings and machinery was $92,618. The total cost of mining was $1,067,739, of which $215,205 was charged as above to plant and development, and $852,534 to stoping and operating.

The ore shipped, 89,664 tons as stated above, produced 116,701 oz. of gold. The cost of stoping and operating was $9.51 per ton. The total receipts and expenditures, with the average per ton, are shown in the statement given below:

	Total.	Per ton.
Ore shipped	$2,334,024	$26.03
Miscellaneous receipts	13,193	0.15
Total	$2,347,217	$26.18
Working expenses	1,875,297	20.92
Net earnings	$471,920	$5.26

Miscellaneous accounts and, a balance from previous year of $244,759, brought the total available balance up to $807,777. Payments for new construction and land purchased were $336,803; dividends, $270,000; total, $606,803, leaving a balance of $200,973 at the close of the year.

The statements of President F. J. Burns, with regard to the Portland Mill, is as follows:

"The delay in the completion of the mill was caused by the failure of the contractors for the structural iron work to comply with the terms of their contract. It was not until the latter part of May, 1902, that the buildings were completed, while said contract required the completion by June 1,

1901. In starting up the mill it was found that there were many defects in the machinery, especially in the roasters, which, coupled with the above mentioned delay, have altogether been a source of annoyance, worry and disappointment to the management, as well as being the means of a financial loss to the company. If the mill construction had been completed, as per contract, and the machinery had been perfect, this company would have made the difference between the cost of having the ore treated at custom mills and smelters and the cost of operating the mill properly, which would amount to almost $2 per ton. All of these imperfections in the machinery are being squarely met, and the improvements on the roasters and other machinery are such that it will be only a matter of a short time before everything will be running along smoothly, as the management anticipated would be the case in the beginning.

"During all this trouble in regard to the imperfections of the machinery and roasters, the contractors sad idly (although being notified time and time again of these various defects), leaving it for the management, through its master mechanic and corps of assistants, to make the improvements that were necessary, and which improvements should have been made by said contractors. Some of the principal defects in the roasters were the screw feeds, that would break every few hours, also the rabble blades and arms. The improvements made on the screw feeds by our master mechanic, Mr. A. E. Johnson, are such that they now work perfectly. As far as the rabble arms are concerned, they also have been improved by Mr. Johnson, and work to perfection. In the construction of the roasters, the hearths, in place of being built of brick, were made of *adobe* or clay, which proved, by operation, to be entirely wrong. Brick hearths have since been put in by the management, made up of a double course of brick, and the result derived from the same are such that where it used to take 45 bbls. of oil per roaster, per day, it now takes about 32 bbls., or a saving of about $50 per day on the three roasters. These are some of the improvements that the management has been able to make with satisfactory results.

"The mill commenced operations in the latter part of May, and from that time to January 1, there has been treated 40,693 tons of ore, which according to the treasurer's statement shows a profit of $1.60 per ton, in the aggregate amounting to more than $60,000.

"With all mills of this class the first few months of operation always witness loss through the absorption of value in various ways, such as that taken up by the brick-lining in the roasters, dust deposited in all the crevices of the buildings, machinery, etc., which loss is never fully recovered, but it is not duplicated or continued to any extent in the further operation of the plant. In spite of the numerous defects in construction, the unavoidable failure of the fuel oil supply, causing many shut-downs, all of which will be overcome in the future, together with the unavoidable loss just mentioned, makes a saving shown in the treasurer's report, of $1.60 per ton in treatment, which in the future should be doubled. This is more than gratifying and amply proves to the stockholders the wisdom of the management in providing for the company in its own mill.

"During the latter part of the year the downward tendency of the average grade of ore shipped has been overcome, and we confidently expect that the present increase in grade will continue for some time in the future. The numerous and costly delays and shut-downs which have limited the capacity of the mill have been gradually overcome. The changes already made in connection with those now in process will soon enable us to run our plant to its full capacity without shut-downs. This will not only allow the handling of a larger percentage of the output at the mine, but will also decrease the cost per ton of treatment."

The report is accompanied by maps and illustrations of the mine and mill, and also by an elaborate report of the water question, by Mr. Victor G. Hills, as consulting engineer; Mr. Chas. J. Moore, as consulting engineer, also submits a report upon the conditions and prospects of the mine.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Gemeinfassliche Darstellung des Eisenhüttenwesens. Prepared under the direction of the Verein Deutscher Eisenhüttenleute. Duseldorf, Germany; A. Bagel. Pages, 164; illustrated. Price (in New York), $1.

Thirty-third Annual Report of the Deputy Master and Comptroller of the Mint of Great Britain, 1902. William Ellison-Macartney, Deputy Master. London; H. M. Stationery Office. Pages, 172.

Annual Report of the Commissioner of Patents for the Year 1902. F. I. Allen, Commissioner. Washington; Government Printing Office. Pages, 960.

United States Geological Survey. The Production of Salt in 1902. By Joseph Struthers. Washington; Government Printing Office. Pages, 18.

The Optical Rotating Power of Organic Substances and Its Practical Applications. By Dr. Hans Landolt. Translated from the German by Dr. H. Long. Easton, Pa.; the Chemical Publishing Company. Pages, 752; with diagrams and illustrations. Price, $7.50.

The American Museum Journal. Volume III., No. 4. New York; the American Museum of Natural History. Pages, 68; illustrated.

Organization and Public Opinion. By Herman Justi, Chicago; published by the Illinois Coal Operators' Association. Pamphlet, pages, 24.

Transactions of the American Electrochemical Society. Volume III., 1903. Philadelphia; published by the Society. Pages, 376; illustrated.

Wisconsin Geological Survey. Preliminary Report on the Lead and Zinc Deposits of Southwestern Wisconsin. By Ulysses S. Grant. Madison, Wisconsin; published by the Survey. Pages, 104; with maps and illustrations.

Wisconsin Geological Survey. Highway Construction in Wisconsin. By Ernest Robertson Buckley. Madison, Wisconsin; published by the Survey. Pages, 340; illustrated.

BOOKS REVIEWED.

United States Geological Survey. Monograph XLIII. The Mesabi Iron-Bearing District of Minnesota. By Charles Kenneth Leith. Washington; Government Printing Office. Pages, 316; with maps and illustrations.

The great Mesabi iron range, undeveloped except for a few test pits and drill holes in 1901 and in 1902, shipping 13,300,000 tons of ore, furnishes a striking example of what can be done in a short time by men skilled in their profession, using the many labor-saving devices that the genius of many inventors has put at their disposal. In this phenomenal development the practical mining man and the skilled geologist have worked together, to whom much of the present development of the iron ores is due. If it has happened that the chemists, from the scantiness of exposures and the resulting difficulty of forming exact conclusions, made mistakes, it is certain that the work of geologists has saved many thousands of dollars to mining companies, and might have saved thousands more had not some practical miner in charge of prospecting work looked on geologists as theorizers, and relied upon his personal views.

The names of those who have tried to work out the baffling problems of pre-Cambrian stratigraphy in the Lake Superior iron regions make a long and honorable list, including Brooks, Pumpelly, Credner, Irving, Van Hise, Wadsworth and the Winchells. To the list must now be added the name of C. L. Leith, whose report upon the Mesabi is already, though but a few months off the press, a guide for the many drilling outfits, searching for new ore bodies along the range. Dr. Leith had the great advantage over his predecessors in that he has not only the benefit of their work, but also the evidence of railroad cuts, of thousands of drill-holes and test pits, and of the many great mines. As is well known, it was the scantiness of the data, a few exposures of lean ore, that caused the Mesabi to be passed on unfavorably by capable geologists, when the Vermillion Range came into prominence. It is little to the credit of men prominent in the iron trade, however, that when the possibilities of the Mesabi were recognized by the same geologists and by some of the best mining captains in this country, they delayed investing and missed opportunities that come but once in a lifetime.

There is no need of criticizing here the work of the Minnesota geologists, who, after years of study, failed to detect the straigraphical relations of the Vermillion ore bodies relations that were seen by others after a few months' study; nor of calling attention to the utterly fantastic hypotheses they proposed for the origin of the Mesabi and Vermillion iron ores. Dr. Leith gives them credit for what they determined. So for as the straigraphical relations and the probable origin of the Mesabi ores are concerned, both these questions have probably been finally answered by Dr. Leith.

After reviewing the geography and topography of the Mesabi District, and pointing out the difficulties that confront the geologist, Dr. Leith reviews the work of previous investigators, and then takes up the geology in detail. He divides the rocks found after the general scheme of pre-Cambrian classification adopted by the United States Geological Survey, discarding the vagaries of Canadian and Minnesota geologists. He finds that, as in other Lake Superior iron regions, the oldest rocks belong to the Archaen or "basement complex," and comprise basalts, diorites, granites, hornblende and mica shists, and possibly some sedimentary rocks. The rocks above the Archaen and below the Keweenawan are divided into the Upper and Lower Huronian, thus bringing the general divisions of the Mesabi into parallelism with other ranges, particularly the Golgebic. The lower Huronian (Kewatin) rocks are sedimentary and igneous. The sedimentary rocks include slate, gray-wacke and conglomerate. The igneous rocks include granite and porphyry, including most of the great granite outburst that forms the ridge of the Giants' Range, north of the Western Mesabi. The sedimentary rocks are compressed into steep folds, have nearly vertical dips, a strongly marked cleavage and near the granite are much metamorphosed. Though resembling some of those found on the Vermillion the Mesabi sediments have not been found to contain the Vermillion iron formation; hence are of little economic importance. The Upper Huronian, which includes the so-called Taconic and much of the Animikie of the Minnesota Survey, contains all the great ore bodies. The Upper Huronian has low dips, and is slightly folded. Dr. Leith subdivides it into (1) the Pokegama quartzite, from nothing to 500 ft. thick, averaging about 200 ft.; (2) the Biwabik iron formation of ferruginous cherts and slates with a basal quartzite, the formation being 200 to 2,000 ft. thick and averaging about 1,000 ft.; (3) the Virginia slate, a generally gray rock of unknown though probably vast thickness, at the base of which are a few feet of gray limestone. In places the limestone has been altered to a crystalline hornstone by the great gabbro intrusions or overflows of the Keweenan. On the Eastern Mesabi an intrusion of

granite, of Upper Huronian age, forms the core of the Giant's Range. This granite Dr. Leith calls the Embarrass granite.

After briefly mentioning various phases of the gabbro that overlies the Upper Huronian, and the occurrence of Cretaceous deposits, with the possibility of lignite beds of workable size being found to the west and north, and the distribution of glacial deposits, Dr. Leith takes up the correlation of the Mesabi formations, pointing out that as the formations are sharply separated the Mesabi may well serve as the type pre-Cambrian district of Lake Superior. He indicates the possible extension of the Mesabi westward and its connection with the Gogebic. In Chapters 8 and 9, some 77 pages, the author discusses the distribution, shape, size, texture and structural relations of the ore deposits, and their probable origin. From a theoretic standpoint the Biwabik iron formation is of great importance, since being less altered by dynamic action than the iron formations on other ranges it is possible to get a clearer idea of its origin. Spurr, in 1893, declared that the iron ores and the various associated cherts, cherty carbonates, paint rock and ferruginous slate had all been derived from the alteration of a rock containing hydrated ferruginous silicate, which he believed to be glauconite. Dr. Leith, however, states that this original ferrous silicate was not glauconite, but a new mineral, which he terms greenalite. It differs from glauconite in containing no potash. He points out that the rock is undoubtedly a sedimentary formation. The iron probably present as carbonate in the Upper Huronian ocean was precipitated as ferric hydrate, but deeply buried with vegetable material it was reduced to the ferrous state, and then combined with silica to form ferrous silicate. The minute granules of greenalite may represent the replacement of shells or other organic remains. Dr. Leith also points out that Spurr's views on the formation of ore bodies along lines of faulting rested on incomplete evidence. He shows that the iron bodies, while often in the trough of broad synclinal folds, sometimes occur on anticlines. He believes that the ore bodies are essentially of surface origin formed by the action of meteoric water, and that the location of ore bodies has been determined by impervious layers in the Biwabik formation, by local shattering of the rock by joint planes facilitating the downward course of the water, and by the erosion of the impervious Virginia slate. He adopts the hypothesis first propounded by the Minnesota Survey that the alteration of iron oxide magnetite east of R. 14 W., and the absence of workable ore bodies are due to the effect of the great gabbro intrusion. In the central part of the range between Mesabi station and the west side of R. 22 W., iron ore may underlie 8 per cent of the surface of the iron formation.

Dr. Leith concluded his admirable report by a brief but comprehensive review of the methods of mining on the range, the transportation of the ores, the production and probable reserve tonnage, the furnace use of the ores, and gives some excellent hints on prospecting.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON SAPPHIRE JEWELS.—Sapphire compass, meter and electrical jewels, about 1-16th of an inch in length and diameter, concave or cup shaped at one end and flat at the other, made of Oriental or Ceylon sapphires, are properly dutiable, either directly or by similitude, as precious stones, at the rate of 10 per cent ad valorem under the provisions of paragraph 435, tariff act of July 24, 1897.—Appeal of Sussfield & Co. from Collector of Customs at New York; Board of General Appraisers.

DUTY ON COLD-ROLLED STEEL.—Strips of steel which have been cleaned by acid and subsequently cold rolled until the surface has become brightened, are dutiable under paragraph 141, act of July 24, 1897, at 1c. per pound in addition to the rates imposed thereon by paragraph 135. It is not neecssary that the brightened surface should be produced by a separate and independent process similar to polishing. It is sufficient if it is brightened as a result of cold rolling.—Appeal of Washburn Wire Company from Collector of Customs at New York; Board of General Appraisers.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Talc in Canada.

Sir.—In view of recent inquiries for talc, a description of the deposit on which I am operating would, I think, be of interest to your readers. The deposit was first opened four years ago. It is situated one mile southeast of Madoc village, in the county of Hastings, Ontario. It is in a dolomite formation; the talc is found in a vein 30 ft. wide, crossing the formation.

A shaft, or pit, has been sunk to a depth of 45 ft. The talc is drilled with a hand-drill, similar to a common coal drill. One set of bits—5 pieces of steel—will drill holes enough to bring down 250 or 300 tons of talc before they have to be sharpened. One man, with a drill, will put in 25 ft. of holes in one day of 10 hours. The talc is blown down with dualin; the broken material is hoisted from the shaft with a horse-whim.

In all about 1,500 tons have been taken out. The material compares well with the imported talc; it is white and soft, and is not badly foliated. It is all shipped to Newark, N. J., at present. There are two ways of shipping. One is in box cars, all-rail, by way of Suspension Bridge. The other is to ship it on flat cars to Belleville, Ont., where it is loaded on boats and taken across Lake Ontario to Oswego, N. Y., and thence by canal to Newark. The box cars are preferred; if shipped in open cars, cinders from the locomotive will fall on the material, and are hard to separate.

C. HENDERSON.

Madoc, Ont., July 22, 1903.

The Wohlwill Electrolytic Refining Process.

Sir—I read in No. 26 of your esteemed JOURNAL, in the answer given on p. 975 to the question regarding the Wohlwill refining process, the information, that, "in this country the process is in commercial use at the United States Mint in Philadelphia, which has the exclusive right to its employment there," and in another place of the same answer, that "for utilizing the process in this country, permission would have to be gotten from Dr. Tuttle at the Philadelphia Mint, who secured the American patent rights from the owner."

I ask you to permit me to reply to this, that the owners of the United States Patents 625,863 and 625,864 regarding said process are the Company Norddeutsche Affinerie and myself, at Hamburg, Germany, and that a license for applying the process has been given by the owners to the Treasury Department of the United States exclusively for the use in the United States Mint in the city of Philadelphia. I am therefore perfectly sure that neither Dr. Tuttle nor the Treasury Department would think themselves entitled to give permission to anybody else for utilizing the process.

The process is used in Germany at the Norddeutsche Affinerie, Hamburg; at the Deutsche Gold- und-Silber-Scheideanstalt, Frankfurt, and at the royal works at Freiberg-Halsbrücke in Saxony. It is not in use—at least not with knowledge of the owners—in France. Any desirable account of the process can be had from the undersigned inventor.

I ask you kindly to publish this rectification in one of the next numbers of your valuable JOURNAL.

EMIL WOHLWILL.

Hamburg, Germany, July 15, 1903.

Coal on the Isthmus of Panama.

Sir.—It is not generally known that coal deposits occur on the Isthmus of Panama within a very short distance of the proposed canal line. They have not been prospected to any great extent, but they certainly deserve to be, especially in view of the probable ratification by Colombia of the Canal Treaty.

The coal is a good bituminous one. It is easy to kindle, burns freely with a long flame, and ought to make a first class steam coal. I am not prepared to say whether the seams are workable with profit for the market at large, but I think that, if worked for local consumption they would prove remunerative. It may seem strange to speak of a local consumption of coal in a country where no coal is needed except for a few locomotives running on the Panama Railroad, but when the Canal Treaty is ratified, and this government has entered on the construction period, there is going to be for 10 years or more a great demand for fuel along that short stretch of 47 miles extending from Colon to Panama, with the Panama Railroad as a distributor.

The construction of the canal will attract to the Isthmus a working population which does not exist there at present. Most of that population will come from Jamaica. In my opinion the Jamaican negro is very well adapted to work in a coal mine in a country like the Isthmus of Panama. Thus would be solved the labor question and mining operations made possible.

The sanitary conditions on the Isthmus will have improved immensely by the time the canal is completed, and most of the working people will choose to stay in the country, which will afford as many facilities for their subsistence as any West Indian island. When steamships, which need coal, will pass through the Canal, the local market, first created by the construction work, will be continued by the canal traffic. I think the presence of coal on the Isthmus of Panama is interesting at this time.

New York, July 26, 1903. F. C. P.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Alabaster.—I have been brought in contact with a large deposit of alabaster in Mexico. Will you please advise me what the demand is in this country for genuine alabaster, and whether there is any quarried in any of the States. What are the market quotations for this stone, and in how large masses or individual pieces must it be quarried to be of commercial value?—N. J. W.

Answer.—Genuine alabaster is simply very pure gypsum found in massive form. The term is sometimes, but incorrectly applied to some kinds of marble or travertine. Alabaster has very little commercial value, considered as a stone. It is used for making statuettes, plaster-casts and occasionally for vases and similar ornamental work. It has been used for the interior decoration of buildings, but is too

soft, and too liable to damage from use or from weather for such purposes. A large deposit would be of value, however, in making the finest grades of plaster and for similar purposes. Gypsum is mined or quarried in a number of the States, especially in Kansas, Michigan and New York, but we know of no instances in which it is obtained of sufficient purity to be called alabaster. The nearest approach is found in one or two places in Kansas.

Specific Gravities.—I will thank you for the specific gravities of the combinations named below; or for definite information as to where the data can be obtained. I have consulted various authorities without success. The combinations are sulphide of gold; chloride of gold; oxide of gold, and sulphide of calcium.—J. R.

Answer.—Standard works on chemistry do not give the specific gravity of all possible compounds, and we have been unable to find any data on this point for the combinations named. A search through many books has failed to give the information. Perhaps some of our readers may be able to come to the aid of a puzzled chemist.

Diatomaceous, or Infusorial Earth.—What are the requirements in the way of analysis and structure for an infusorial (diatomaceous) earth of commercial value? In your current price-list of minerals, you quote the American article based at $20 a ton, while French is quoted at $37.50, and German at $40. What causes the greater value of the imported earth? Can you refer me to a specialist on the subject?—J. M. P.

Answer.—As a rule, no analysis of infusorial earth is required. It should be as nearly pure silica as possible, containing as little impurity in the way of clay, iron oxide, etc., as possible. A typical analysis of diatomaceous earth gave 82 per cent soluble silica and 17.5 per cent insoluble, the remaining 2.5 per cent being clay and other minor impurities. A commercial earth of this kind should be fine, and fairly uniform in size and grain. The French and German article brings more in the market, because it has been carefully prepared and freed from adherent impurities.

Dr. David T. Day, of the United States Geological Survey, Washington, D. C., is an expert with regard to diatomaceous earth, fuller's earth and other forms of silica. He has made many experiments with the material.

Onyx.—What colors of onyx are most valuable? How do the values range as to the size of blocks? We have first class stones on the dump which will square from 1 cu. ft. to 60 cu. ft. to the piece. Which are considered the most valuable propositions; those where the stone is in more or less solid ledges, or those where the stone is broken up or in boulders? Does onyx deteriorate in value by exposure to the air?—D. R. W.

Answer.—The value of onyx is extremely variable. It depends chiefly upon uniformity of texture and grain, color, and the size of the stones which can be taken out. Clearness or translucency is also a point of importance. As to the color preferred, it depends entirely upon taste, or rather fancy and caprice. In referring to size, the intention is to express surface, independent of thickness. Onyx is generally used for decorative purposes, and in thin sheets or slabs, not in solid blocks, and the larger the slab which can be cut, the better, in most cases where it is used. As to the best form of proposition, it depends entirely upon local conditions. The boulder may be weathered, or possibly split, while, on the other hand, where the onyx is in a bed it may be in a position difficult to quarry, breaking up the stone too much. Onyx is apt to be injured as to its surface by exposure to the weather, except in a very dry climate. Upon the whole, the market for this stone must be considered an uncertain one, dependent, as we have said, upon fashion and taste. You will find some valuable information with regard to onyx in Merrill's "Stones for Building and Decoration."

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending July 21, 1903.

733,931. FURNACE FOR MELTING METALS.—James J. Anderson, South Haven, Mich., assignor to Oil Burner Furnace Company. The combination with a supporting-frame, of a tilting furnace pivotally mounted in said frame, a shelf pivotally suspended from said furnace, a slotted bracket on the frame, and an arm secured to the shelf and movably entering the slot on the bracket to constantly maintain the normal position of the shelf with reference to the horizontal regardless of the angle to which the furnace is tipped.

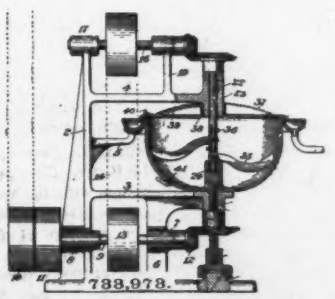
733,933. STAMP-MILL.—Richard J. Baker, El Paso, Texas. In a stamp-mill a frame including an annular upright, a plurality of levers pivoted radially to said upright, cam-shaped projections upon the upper sides of said levers, vertically-movable stamping-stems having tappets engaging and adapted to be gradually rotated by the cam-shaped projections of said levers, rollers upon the outer ends of said levers, and a suitably-supported annular gear-wheel having cams adapted to engage said rollers.

733,939. EXCAVATING MACHINE.—Frank M. Bisbee, Chicago, Ill., assignor to Frederick C. Austin, Chicago, Ill. In an excavating machine, a body-frame; a tilting beam and a fulcral support therefor on the body-frame, the beam being extended below its fulcral support to dip into an excavation and extended above such fulcral support to form an upper lever-arm, said beam being also longitudinally adjustable independently of its fulcral support to permit its lower end portion to be lowered within and raised from the excavation; mechanism for longitudinally adjusting the beam; a push-and-pull beam-shifter for tilting the beam arranged to apply the tilting power to the upper lever-arm formed by the portion of the beam above its fulcral support; an excavating device arranged to traverse the tilting beam; and mechanism for reciprocating the excavating device along said beam.

733,944. ORE-WASHER.—Charlie Carlson, Joplin, Mo. In an ore-separator, the combination with a suitable frame, of a table mounted therein with its longitudinal edges abutting against the sides of the frame, said table being uniformly inclined both longitudinally and transversely, and adapted to travel continuously in the direction of its longitudinal inclination to discharge the separated material, means for delivering material transversely to the table at its higher side, and means for discharging the impurities transversely from the table at its lower side; whereby the material in its passage transversely across the table will be separated into strata of varying degrees of purity and be delivered in its separated condition at the lower longitudinal end of the table.

733,957. PROCESS OF MANUFACTURING HOMOGENEOUS METAL CASTINGS.—Hans Goldschmidt and Walther Mathesius, Essen-on-the-Ruhr, Germany. A process of manufacturing homogeneous metal castings, consisting in bringing a mixture of an oxygen-containing metal compound and aluminum in reaction under the surface of the molten metal and holding the mixture under the surface of the molten metal while the reaction goes on.

733,973. GOLD-SEPARATOR.—Daniel C. Knowlton, New York, N. Y. The combination with a supporting-frame of parallel horizontal shafts supported in bearings of the



frame, two vertically-alined shafts supported in bearings of the frame, and geared to said horizontal shafts to be revolved in opposite directions, a tank centrally mounted upon the lower vertical shaft, and a plurality of blades, each having a compound curvature and adjustably secured to the upper vertical shaft so as to project directly therefrom toward the tank-walls at variable angles.

733,965. CONVEYER.—George C. Horst, Columbus, Ohio, assignor to Joseph A. Jeffrey, Columbus, Ohio. A flight and attachment for cable-chain formed with links having the two halves each formed with a semicavity adapted to receive a link and flaring sockets or mouths to receive the adjacent links and permit their free articulation, hub-like part at one end and laterally-expanded disk-like flight at the other, the two parts of the flight being separable on the plane of the link.

733,980. WELL-DRILLING MACHINE.—Geo. D. Loomis, Tiffin, Ohio. In a well-drilling machine, the combination of a bull-wheel shaft having a pulley and a crank, said pulley and said crank being fixed to said shaft, a walking-beam, a pitman to connect the latter to the wrist of said crank, whereby the walking-beam may be driven directly from said bull-wheel shaft, a gear loose on said bull-wheel shaft, a brake for said gear to arrest rotation thereof, a drill-rope reel driven by said gear, a clutch to lock to said bull-wheel shaft, and a sand-rope reel having a shiftable pulley adapted to be engaged with and driven by said pulley.

733,987. BINDER FOR BRIQUETTES.—Francis B. Merrill, New York, N. Y., assignor to Merrill Process Company. A method of producing a binder or agglutinant for granular materials consisting in distilling coal-tar, water and sulphate of iron at a temperature of 570° F., or thereabout.

733,988. FEEDING DEVICE FOR CONVEYORS.—Carl Mittag, St. George, N. Y. A feeding device for conveyers, and comprising a frame; a shaft rotatably mounted thereon; a feed-screw mounted on and rotating with the shaft; a sleeve surrounding the feed-screw; a chute adapted to register with the sleeve; means for attaching the sleeve to the chute; and a delivery-chute adapted to receive material fed through the sleeve.

734,002. PROCESS OF MANUFACTURING COAL BRICKS, PARTICULARLY FROM BITUMINOUS BROWN COAL.—Johann M. Schwarz, Eiken, Switzerland. A process for manufacturing coal bricks, which consists in comminuting coal and particularly brown-coal waste, then mixing therewith waste from the manufacture of animal glue and submitting the product to high pressure.

734,030. PROCESS OF PRODUCING MAGNESIUM AND CALCIUM CARBONATES.—Frank S. Young, Norristown, Pa. A process of obtaining magnesium carbonate from dolomite, which consists, first, in allowing a mixture of water and calcined dolomite to settle until the magnesia has been precipitated; second, in withdrawing the precipitated magnesia and subjecting it to carbonation, whereby a solution of magnesium bicarbonate is produced; third, in reducing the magnesium bicarbonate to carbonate and recoverng the same.

734,045. OIL-TANK.—Thomas W. Castleman, New Orleans, La. An oil-tank comprising an excavation in the earth extending to the water-line, levees formed around the same, a trap-ditch around the levees extending from the earth's surface below the water-line, and a trough formed in said levees.

734,058. MACHINE FOR PILING METAL SHEETS.—Charles W. Bennett, Elwood, Ind., and Berthold Goldsmith, Pittsburg, Pa., assignors to American Tin Plate Company, New York, N. Y. In a carrying-off table for metal sheets, a rotary discharger therefor varying in diameter at different points in its length, and means for holding a sheet in engagement therewith whereby portions of the sheet in the line of travel are temporarily distorted from the general plane of the sheet.

734,070. THREE-HIGH MILL.—Julian Kennedy, Pittsburg, Pa. A three-high mill having a middle roll provided with a vertically-movable bearing-box and a rest-bar which interfits with the box at the side of the latter and holds the box against outward motion, said box being removable outwardly when the rest bar is disengaged.

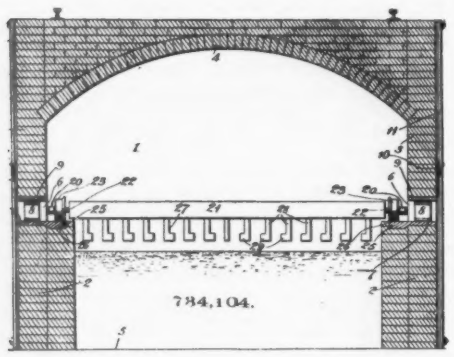
734,081. WATER-COOLED VALVE.—Niven McConnell, Donora, Pa. A regenerative reversing-valve, comprising a cylindrical casing having a port at one end, and provided with a plurality of ports extending through its side, and a turning-valve within the casing having a passage extending through it and in constant communication with the end port of the casing, said valve having a side port arranged to register with either of the side ports of the casing.

734,114. COIL-HEATING FURNACE.—Rudolph G. Beker, Pittsburg, Pa., assignor of two-thirds to Frederick H. Kindl, Pittsburg, Pa. A furnace having a heating-chamber, a rotatable coil-support in said chamber, and mechanism for rotating said coil-support, said mechanism comprising driving means, two separate connecting devices between the driving means and coil-support, one of said devices being arranged to rotate said coil-support in one direction and the other of said devices being arranged to rotate the coil-support in the opposite direction, and means for connecting either of said devices to the coil-support and driving means.

734,151. CONVEYER.—Lawrence Abraham, Brooklyn, N. Y. In a conveyer, the combination with a shelf secured to a carrier, and said carrier and shelf having a downward movement, and a movement transverse thereto at the end of said downward movement, and a substantially horizontal bed situated in the downward course of said shelf and on a plane below the transverse course of the carrier, and constructed and arranged to arrest and support said shelf

in a substantially horizontal position, whereby it will be caused to slide from such bed in such position.

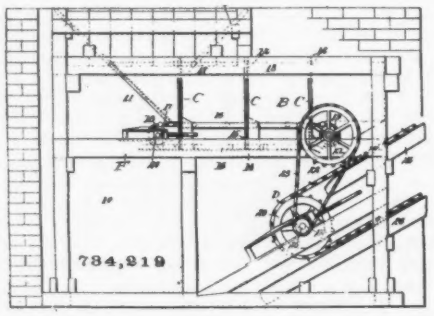
734,104. ORE-ROASTING FURNACE.—Elihu Swain and Dr. C. Wood, Iola, Kan. The combination in an ore-roasting furnace of side walls formed with upper and lower spaced sections having an air-inlet opening between said sections, tracks within said furnace on said lower



wall-sections, said tracks having their upper surfaces flush with the top of said lower wall-sections and having a groove formed in said lower wall-sections adjacent to one side of each of said tracks, and rake-carriers having wheels provided with flanges adapted to traverse said tracks and move in said grooves.

734,168. PREVENTION AND REMOVAL OF INCRUSTATION IN STEAM-BOILERS.—Robert L. Gamlen, Bromley, England. A method for the prevention or removal of boiler incrustation, which consists in introducing into the boiler and dispersing throughout the water therein bast fiber which has been shredded and teased to a fine state of division.

134,219. APPARATUS FOR SEPARATING BONE, SLATE, ETC., FROM COAL.—Charles H. Boardman and John W. Miskell, Vivian, W. Va., assignors of one-third to Theophilus King, Quincy, Mass. An apparatus comprising



a picking-conveyer, means for spreading the coal, bone, slate, etc., thereon in a layer of predetermined quantity to prevent overlying of the pieces, and means for causing the pieces to retain their relative positions while passing a given point to enable a picker to remove the bone, slate and other impurities without interference by changes in position of some of the pieces.

734,240. PULVERIZING AND CLEANING MINERALS.—Georg C. Proffe, Hamburg, Germany. A process for pulverizing and cleaning minerals consisting in subjecting the mineral to the action of heat, whereby it is pulverized, cooling the powder thus obtained, and finally cleaning the powder by separating all lumps of mineral and all impurities by means of sieves.

734,282. FLUID-PRESSURE ENGINE.—John Pengilly, Dover, N. J., assignor to McKiernan Drill Company, Dover, N. J. In a fluid-pressure engine the combination of a cylinder, a piston therefor, a valve-chest, a piston-valve therefor, exhaust-passages leading from near the ends of the valve-chest and communicating with the cylinder which are controlled by the movements of the piston in the cylinder, passages leading out from the interior of the valve-chamber and communicating with the opposite ends thereof, the ports of which are alternately opened and closed by the movements of the valve in the chamber.

734,286. METALLIC INGOT OR CASTING.—George Thomson, Elizabeth, N. J. A product consisting of a casting the body of which is of steel and the lower face of which is mainly of a nickel-copper alloy of greater specific gravity.

734,299 and 734,300. TUBE-FORMING APPARATUS.—William Cairns, Elyria, Ohio, assignor to the Elyria Iron and Steel Company, Elyria, Ohio. In an apparatus for forming tubes, the combination of two forming-rolls having respectively a tongue and groove whose faces are flat and whose sides are curved in circular arcs, with a former into which the bent skelp is delivered from said rolls, which former contains a channel which fits the bent skelp as it is delivered from said roll, and which gradually assumes a circular form in cross-section, a mandrel in said channel anchored to the top wall thereof and extending out of the delivery end, and two grooved finishing-rolls between which the end of said mandrel projects.

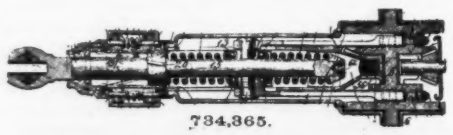
734,303. AIR-COMPRESSOR.—George Code, Melrose, Mass., assignor, by direct and mesne assignments, to United States Atmospheric Oxygen Company, Boston, Mass. A pump having a cylinder mounted on a revolving frame, the piston being connected to an eccentric at the center of revolution of the frame.

734,312. APPARATUS FOR THE ELECTROLYTIC DECOMPOSITION OF ALKALI CHLORIDE.—Charles Fournier, Geneva, Switzerland. In an apparatus for the electrolysis of alkaline chloride, an anode-compartment, a cathode-compartment, comprising a plurality of separate cell superimposed upon and in communication with each other, and an intermediate compartment, said anode and cathode compartments being separated from said intermediate compartment by porous walls.

734,332. CRUSHER.—Timothy E. Hurley, Butte, Mont. In a crusher, a frame, a fixed jaw, a swinging jaw, an eccentric-shaft having bearings in said frame, a pitman operated by the eccentric-shaft and connected with the swinging jaw, bushings arranged in the pitman-head and surrounding the eccentric-shaft, removable plates on the sides of the head and engaging the outer ends of the bushings, the inner ends of said bushings being spaced apart, rollers arranged between the bushings and the eccentric-shaft and spaced apart at their inner ends, the outer ends of said rollers engaging the removable plates, a collar rigidly secured to the shaft at the space between the bushings and arranged between the inner ends of the rollers to prevent end movement of said rollers, the said collar having peripheral notches, an oil-cup on the upper side of said head, a central duct leading from said oil-cup to the space between the inner ends of the bushings, and ducts at opposite sides of the central duct and extending through the said bushings to the rollers.

734,364. ROCK-DRILL.—Peter Reinhalter, Philadelphia, Pa., assignor to Quincy Electric Drill Company. In a rock-drill, a cylinder, a cross-head therein and having oppositely-located extensions, a drill-rod passing loosely through said cross-head, means carried by said cross-head and projecting through slots in the casing for reciprocating the cross-head, abutments upon opposite portions of said drill-rod, ball-bearing devices carried upon opposite portions of said cross-head and received within said extensions, springs interposed between said abutments and ball-bearing devices, and means for reciprocating said cross-head.

734,365. ROCK-DRILL.—Peter Reinhalter, Philadelphia, Pa., assignor to Quincy Electric Drill Company. In a rock-drill, a drill-rod, means for reciprocating the latter, a head on said drill-rod, inclined tongues on said head, a



sleeve surrounding said head, inclined grooves in said sleeve, cams located oppositely to said sleeve and torsional devices for rendering said cams inoperative as the drill-rod moves in a backward direction.

734,391. PROCESS OF MAKING PIGMENTS.—William J. Armbruster, St. Louis, Mo. A process of making pigments which consists in mixing solutions of zinc and barium salts with the hydrates and carbonates of an alkali metal and recovering the resulting precipitates.

734,392. PIGMENT AND PROCESS OF MAKING SAME.—William J. Armbruster, St. Louis, Mo. The process of making pigment which consists in mixing solutions of zinc and barium salts which do not react on each other, and the carbonate of an alkali metal, and recovering the resulting precipitates.

734,393. PYROMETER.—Max Arndt, Aix-la-Chapelle, Germany. A pyrometer comprising a closed vessel, a body movable therein to displace air from one end to the other of said vessel, a manometer connected to the vessel and means for placing said vessel in communication with the atmosphere.

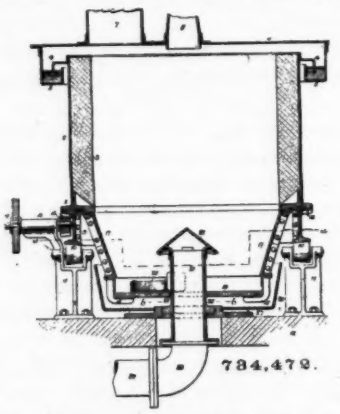
734,397. SULPHUR-BURNER.—Henry Blumenberg, Jr., Daggett, Cal. In a sulphur-burner, the combination of a burner-chamber having a main air-supply pipe under pressure and a discharge-opening, with a second independent air supply pipe under pressure disposed outside the chamber and having branch pipes projecting therein and means for supplying air under pressure to both supply pipes.

734,433. HOISTING-BUCKET.—Cecil L. Saunders, Cleveland, Ohio, assignor to John McMyler, Cleveland, Ohio. In a hoisting-bucket, the combination with the frame of a power-driven shaft, a scoop, two links pivoted to the frame and pivoted to said scoop, one in advance of the other, and connections between said power-driven shaft and said scoop to cause it to be first shifted upon the lower end of the rear link as a pivot and then shifted upon the pivots of both of said links.

734,457. PROCESS OF MAKING BRICKS OR BODIES FOR REFRACTORY LININGS OR OTHER USES.—Ernst W. Engels, Dusseldorf, Germany. A process for the production of bricks or bodies for refractory linings and other uses, which consists in commingling carborundum with a binding material, and then applying said mixture in a wet state intimately to the surface of a relatively less refractory brick or lining-body, and finally evaporating the moisture to cause the coating to adhere in a substantially dried state, whereby, when the composite structure is subjected to high temperature, the coating and the brick or lining will be intimately united and a hard refractory surface produced, which does not readily crack or separate from the body portion.

734,458. PROCESS OF MAKING BRICKS OR BODIES FOR REFRACTORY LININGS OR OTHER USES AND THE PRODUCT THEREOF.—Ernst W. Engels, Dusseldorf, Germany. A process of producing bricks or bodies for refractory furnace-linings or other uses, which consists in applying to the surface of unburned brick while in a plastic state carborundum, and forcing the carborundum into the surface by pressure, before firing the said brick or body, and subsequently firing or burning the said brick or body at a temperature less than that of the electric arc for producing a highly refractory surface which does not readily crack or separate from the less refractory and more fusible interior portion.

734,472. GAS-PRODUCER.—John W. Seaver and Thomas R. Morgan, Cleveland, Ohio, assignors to the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio. The combination of a gas-producer having a rotatable and



depending ash-hopper and an ash-supporting bed or plate located below said hopper and rotating therewith and providing a space between them, and one or more stationary arms for pushing the ashes outwardly through the space between the bottom of the ash-hopper and the ash-supporting plate as the same are rotated.

734,482. PROCESS OF TREATING WURTZILITE FOR PAINTS, VARNISHES, ETC.—Samuel R. Whitall, U. S. Army, assignor, by direct and mesne assignments, of eleven-twentieths to Frank Macomb Whitall and Joseph R. Edson, Washington, D. C. The process of dissolving wurtzilite by subjecting it to the solvent action of petroleum or its distillates.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending July 4, 1903.

12,702 of 1902. ELECTRIC FURNACE.—G. Gin, Paris, France. Electric furnace for simultaneously producing ferrosilicon or ferromanganese, and sulphate of alkalis and alkaline earths.

12,778 of 1902. CONCENTRATION BY OIL.—A. Froment, Traversella, Italy. In separation of ores by oil concentration, the addition of substances to generate gas which makes the separation more rapid.

15,123 of 1902. ROCK-DRILL.—H. Collins, Johannesburg, Transvaal. Improved methods of mounting drills and bits in rock-drilling machines.

15,233 of 1902. MINE HOIST.—J. F. Cook, Johannesburg, Transvaal. Method of hoisting in mines by means of a set of cars each of which takes up the material a certain distance and then discharges it into the next.

15,791 of 1902. TUBE MILL.—G. Zarniko, Hildesheim, Germany. In pulverizers of the tube type the use of rolling rod with an angular instead of circular section.

16,295 of 1902. CONCENTRATING SOLUTIONS.—H. W. Hemingway, London. Plant for the concentration of sulphate of iron or other solutions, having stirrers or scrapers to prevent the deposition of solids at the bottom and side.

4,376 of 1903. WASHER FOR GOLD-BEARING SANDS. P. Maurice, Paris, France. Improvements in the inventor's rotary troughs for washing auriferous sands.

5,448 of 1903. GALVANIZING PROCESS. I. Szirmay and L. von Kollerick, Budapest, Hungary. Improved method of adding double sulphate of aluminum and magnesium to sulphate of zinc so as to make it more suitable for the electrolytic galvanizing process.

7,016 of 1903. ALUMINUM SOLDER.—R. F. Pelletier and E. S. Sempṛun, Madrid, Spain. An aluminum solder, consisting of 60 parts of tin and 30 of aluminum; and with copper, silver, bismuth, antimony, sulphur and arsenic.

PERSONAL.

Mr. Ben B. Lawrence has returned from Ontario.

Mr. C. H. McNutt, lately of Colorado, has gone to Chile.

Mr. A. C. Burrage, of Boston, arrived on July 25 by the *Umbria*.

Mr. A. B. Browne, of Sumpter, Ore., has returned from New York.

Mr. Emerson Gee, of Los Angeles, Cal., was at Denver, Colo., recently.

Mr. W. A. Wilson, of Salt Lake, Utah, has returned from a visit to California.

Mr. Herman A. Keller has returned from the examination of mines at Mackay, Idaho.

Mr. Fred D. Smith, manager of the Snow Creek Mine, at Sumpter, Ore., is in New York.

Mr. J. H. Curle and Mr. Philip L. Foster sailed from New York by the *Oceanic* on July 29.

Mr. F. H. Minard, of Denver, has been in British Columbia recently, and is now at Yreka, Cal.

Mr. Alvin Brooks has returned to Lead, S. D., after spending 18 months at Ashanti, West Africa.

Mr. Henry C. Beeler, State geologist of Wyoming, is investigating dust explosions in coal mines.

Mr. J. E. Spurr, of the United States Geological Survey, is expected at Washington from Nevada.

Dr. Theo. B. Comstock, of Los Angeles, has returned from El Carmen mines, in Durango, Mex.

Mr. Archibald K. Firth, of the Firth Sterling Steel Works, Sheffield, Eng., has been at Pittsburg, Pa.

Mr. Frank J. Dennis has arrived per steamer *Campania* en route from London to British Columbia.

Mr. A. H. Fay has gone to Cananea, Mex., to take a position with the Green Consolidated Company.

Mr. David E. Roberts, manager of the Dowlais Iron Company, of South Wales, is visiting this country.

Mr. R. E. Hazard, of Paris, has arrived by the *Kaiser Wilhelm II* and leaves shortly for Colombia.

Mr. E. H. Lunken, president of the Lunkenheimer Company, of Cincinnati, O., has returned to Denver.

Mr. C. O. Baker, Jr., of New York, is in London, en route to Russia. He expects to return in October.

Mr. J. A. Kebler has been reappointed chief executive manager of the Colorado Fuel and Iron Company.

Mr. D. Buckles is now acting superintendent of the Mary McKinney Mining Company, near Cripple Creek, Colo.

Mr. Frank Clemes Smith, of the Chicago office of the Engineering Company of America, is in New York.

Col. James A. Panting has returned to Baker City, Ore., from a visit to New York and other Eastern cities.

Mr. Edmund O. Hovey sails on the *Moltke* on August 6. He is going to the Congress of Geologists, at Vienna.

Mr. T. A. Bennet sailed for South America last week. He goes to Cerro de Pasco and then to Colombia.

Mr. F. W. Bradley, of San Francisco, is now at the Alaska Treadwell Mine, on Douglas Island, Alaska.

Mr. Franz A. Schneyder, of El Paso, Tex., has been appointed superintendent of the Terrazas Smelter, in Mexico.

Mr. J. J. Welborn has been appointed acting general manager of the Colorado Fuel and Iron Company, at Denver.

Mr. Chester W. Purington, who has been examining properties near Lake City, Colo., has returned to Denver.

Mr. Deane P. Mitchell arrived in New York from London on July 25 by the *Umbria* and proceeds shortly to New Zealand.

Mr. John W. Nesmith, president of the Colorado Iron Works Company, of Denver, Colo., has returned from San Francisco.

Dr. Joseph Hyde Pratt is expected in New York on his return from professional work in Nevada, California and Arizona.

Mr. N. C. Bonnevie of Denver, has returned from the examination of the Henson Creek Lead Mines, in Hinsdale County, Colo.

Mr. Robert Young, of Tacoma, has gone to direct diamond drill explorations at Boulder Creek, on the Cle-Elum River, Wash.

Mr. A. J. Hirsch has resigned as manager of the Prosper Mines, at Hillsboro, N. M., and is succeeded by Mr. W. S. Nowland.

Mr. J. Trowbridge Bailey is expected in New York this week. He has been making examinations in Nevada and in Colorado.

Mr. Simon Guggenheim and Mr. E. L. Newhouse left New York on July 22 for Colorado and Utah, to be absent about two weeks.

Mr. E. H. Platt, who used to be with the Denver Engineering Works, is now with the Creston-Colorado Company, at Torres, Sonora, Mex.

Mr. S. W. Taylor, New York representative of the Colorado Iron Works Company, returned recently from a visit to Nevada and California.

Mr. W. H. Adams, of New York, has returned from the examination of mines on Prince of Wales Island, Alaska. He is now at Portland, Ore.

Mr. L. C. Doty, formerly superintendent of the Ely Mining and Milling Company, at Ely, Nev., is now manager of the Giroux Consolidated Mines there.

Mr. J. W. Platten has been appointed assistant to the president of the Lehigh Valley Coal Company, with offices at 228 South Third street, Philadelphia.

Mr. Arthur Brock has resigned as president of the Tonopah Mining Company, at Tonopah, Nev., and is succeeded by Mr. J. W. Brock, of Philadelphia, Pa.

Mr. George B. Lee, superintendent of the Phelps, Dodge & Company's new smelter at Douglas, Ariz., was at Grand Forks, B. C., recently, visiting the smelters.

Mr. Geo. A. Marsh has been appointed superintendent of the Eilers smelting plant at Pueblo, Colo., and Mr. Irving A. Palmer succeeds Mr. Marsh as assistant superintendent.

Mr. A. A. Steel, of the Engineering Company of America, having concluded examinations in Colorado, has gone to New Mexico and Arizona. He is due at Florence, Ariz., next week.

Mr. D. E. Heller has resigned the management of the Calumet & Arizona smelter, at Douglas, Ariz., and is succeeded by Mr. Jack Woods, lately with the Copper Queen reduction works.

Mr. Bradley Stoughton has been appointed acting head of the department of metallurgy, Columbia School of Mines, in the absence of Prof. Henry M. Howe on his sabattical vacation.

Prof. J. S. Kemp, of Columbia University, New York, accompanied by the senior class in the department of mining has been visiting various mining and milling districts in Colorado.

Mr. Geo. H. Robinson, of Salt Lake, has returned from British Columbia. He is now at Butte, Mont., where he is consulting engineer for the properties controlled by Mr. F. August Heinze.

Mr. Lee Wood, of Cripple Creek, Colo., has started for West Africa to superintend mining operations for a London company. He is accompanied by Mr. S. C. McCommings and Mr. Charles Sharp.

Dr. Benjamin S. Marigold, instructor in industrial chemistry at the Worcester Polytechnic Institute for the past three years, has been appointed assistant professor of chemistry in Clark College.

Mr. W. H. Van Sickel, lately manager of the New York office of the Under-Feed Stoker Company of America, has accepted the position of superintendent of the Thos. H. Dallett Company, Philadelphia.

Mr. P. A. Mosman, formerly superintendent of the Eilers plant of the American Smelting and Refining Company, at Pueblo, Colo., has been appointed superintendent of the Arkansas Valley plant at Leadville.

Mr. Ross E. Browne has been appointed trustee of the California State Mining Bureau in place of W. C. Ralston. Mr. Harold T. Power, of the Hidden Treasure Drift Mine, Placer County, is another new trustee.

Mr. Sadasaburo Naramura, manager of the Yamagata sulphur mines, on the Island of Hokaido, Japan, has been at Seattle, Wash., investigating the opportunities for increasing the sale of Japanese sulphur in this country.

Dr. O. H. Tittmann, superintendent of the United States Coast and Geodetic Survey, sailed for Europe on the *Blucher* on July 23, to represent this government at the conference of the International Geodetic Association at Copenhagen, on August 4.

Mr. Webster Brown, of Seattle, Wash., who has been examining transportation facilities to the north of Silverton, Wash., has recommended the construction of a standard gauge road to handle the product of the Bornite Company's group. This road will also accommodate the Helena, Copper Twelve and Grizzly.

Dr. F. W. Cragin, of the department of geology of Colorado College, has received from public-spirited citizens a grant of funds to enable him to conduct special researches in the early history of the Rocky Mountains and Great Plains. He has resigned his chair in the college and will devote a considerable part of the coming year to travel in the interest of these researches.

OBITUARY.

M. L. Dawson, of Lynchburg, Va., was recently murdered by Mexicans while prospecting near Acampo, Chihuahua, Mex. It is supposed that robbery was the motive. Mr. Dawson was superintendent of the Minas Prietas property, in Sonora, Mex.

Wilbur C. Knight, professor of geology in the University of Wyoming, died July 29 from peritonitis at his home at Laramie, Wyo. Prof. Knight, though but 45 years of age at his death, did much for the legitimate development of the mineral resources of Wyoming. A sketch of his life and work will appear in this paper next week.

Dana Harmon died at his home, at Oakland, Cal., July 9 from heart disease. Mr. Harmon was born at New Orleans, La., in 1849 and went to California in 1854. He afterwards studied at an Eastern college and returned to California, where he engaged in mining. He was a close observer and an investigator, giving particular attention to the milling of gold ores. He wrote "The Stamp Milling and Amalgamation of Free Gold Ores." Mr. Harmon had a wide circle of acquaintances in the mining world. A widow and four children survive him.

Oscar Szontagh, one of the most widely known metallurgists in the West, committed suicide at Spokane, Wash., on July 21 by shooting himself in the head with a revolver. He was despondent over his inability to procure a satisfactory position, and was in financial straits. Mr. Szontagh was born in Vienna 51 years ago, and had a technical education abroad. He had lived in this country about 20 years, and was formerly with the firm of Szontagh & Costell, San Francisco. He was the first manager of the Portland, Ore., smelter, and laid out a plan of reduction for the Eureka and Excelsior Mine, in Eastern Oregon. Later he was engaged in his profession at Salt Lake and in Colorado. About two years ago he came to Northport, Wash., to take charge of the Le Roi smelter. He conducted it with success until he quarreled with General Manager John Mackenzie, of the Le Roi Company. He had made his home in Spokane for the past eight months. He leaves a widow in San Francisco.

SOCIETIES AND TECHNICAL SCHOOLS.

HARVARD UNIVERSITY.—The University has established a course in forestry, and Mr. R. T. Fisher has been appointed instructor in this subject.

PENNSYLVANIA STATE COLLEGE.—The summer work in mining surveying and mining was held at the mines of the Mosgrove Coal Works, at Mosgrove, Pa. The time of the class was occupied in surveying and mapping some of the mines of that company and in studying haulage, transmission of power, drilling and other mining methods. Special attention was given to the use of electric power. The work was under the charge of Superintendent William L. Affelder, of the Mosgrove Coal Works, and George H. Deike, of the college. A similar course will be given every summer for the students in the Department of Mines and Mining.

INDUSTRIAL.

The new steel plant at Monterey, Mex., is producing about 350 tons of steel daily, chiefly structural material.

The Leader Oil Company, of Thayer, Kans., has purchased a Weber 10 h.p. gasoline engine to pump its well at Thayer.

The Portland Iron and Steel Company, of Portland, Me., is rebuilding its plant, which was destroyed by fire some time ago.

O. W. Gaffin, of Lexington, Mo., has recently installed a Weber special 5 h.p. engine in his mines at that point to operate fans and pumps.

Compania Minera de Penoles, of the State of Durango, Mex., is installing four Jeanesville Iron Works electric station pumps for 1,000 ft. lift.

The George Leyner Engineering Works Company, of Denver, Colo., is making shipments of its specialties to the R. E. Briggs Company, Ltd., of Mexico City.

The Combination Rubber and Belting Company, of Bloomfield, N. J., states that it is anxious to secure good agencies all over the United States for the handling of its mechanical and moulded rubber goods.

The Waters-Pierce Oil Company is about to build a refinery at Tampico for extracting paraffin from crude petroleum. The company has obtained a concession from the Mexican Government and has purchased a site.

The Astoria Steel Company, of Astoria, New York City, expects to be ready to manufacture steel castings by October. The plant will have a capacity of 100 tons per day. P. J. Ryan, formerly of the Penn Steel Casting Company, is manager.

The National Pneumatic Ore Concentrate Company, of Layton, O., is preparing to erect a dry ore concentrating plant at some place in Utah. An experimental plant has been on trial at Taylor & Brunton's sampler at Murray. J. J. Snyder is president of the company.

The Best Manufacturing Company, of San Leandro, Cal., states that it has sold five of its traction engines and 15 of its 16-ton steel freighting trucks in Mexico, the sale amounting to $15,000. The company is also filling orders for freighting outfits for Central America, and the demand for these outfits is taxing the capacity of the company's works.

At a recent stockholders' meeting of the Cumberland Steel Company, at Cumberland, Md., the following directors and officers were elected: Merwin McKaig, president; W. J. Muncaster, vice-president and general manager; Albert Charles, secretary and treasurer, with Robert Shriver, William Pearre, William C. McKaig, Robert R. Henderson and A. Hunter Johnson as other directors.

The Carnegie Steel Company will erect five more 50-ton open-hearth furnaces at its South Sharon, Pa., works. The plant has 12 furnaces of 1,200 tons daily capacity at present. With the five additional in operation, the output will be 1,700 tons daily. It is expected that the two new blast furnaces will be blown in within a few months. Extensive improvements are planned for the Edgar Thomson plant at Braddock, Pa., where 14 acres of land have been purchased and 12 soaking pits are to be built. The Ohio plant at Youngstown, O., is to be blown in July 25.

The Union Carbide Company, at Sault Ste. Marie, Mich, has closed a transportation contract with the Duluth, South Shore & Atlantic Railway and W. B. Collins, president of the Bradley-Watkins Company, for 1,000,000 tons of limestone delivered at the rate of 200 tons daily. A new limestone property will be opened about five miles from the Soo and a railroad built to it. The contract provides for the purchase of the Bradley-Watkins logging road.

The Smokeless Combustion Company, of New York City, is in financial difficulties and a petition in bankruptcy has been filed against it by Edward J. Berwind, Berwind-White Coal Mining Company, and others. Mr. Berwind is the principal owner of the company, which he backed financially. W. De L. Walbridge is president; Mr. Berwind has been vice-president and H. B. Potter secretary. The company is a West Virginia corporation, incorporated August 28, 1899, with a capital stock of $4,000,000, and succeeded the Smokeless Fuel Saving Stove Company.

W. O. Duntley, general manager of the Chicago Pneumatic Tool Company, left Chicago July 25 on a trip to the Pacific coast, to extend over a period of several weeks. He states that business in the pneumatic tool line is flourishing and that while the usual summer depression is somewhat noticeable, the various plants of his company are still working increased forces. Henry Engels, 91 Fremont street, San Francisco, who represents the company on the coast, has lately secured several large orders for pneumatic equipment including a number of the Franklin air compressors from Western concerns.

G. W. Price, of San Francisco, has organized the firm of G. W. Price & Co., which will manufacture centrifugal pumps for irrigation, dredging and draining and for pumping tailings. Mr. Price recently designed and built pumps which, tested by disinterested engineers, showed efficiencies as high as 87 per cent. His pumps will hereafter be known as the Price California and the Price Pacific centrifugal pump. He is the owner of patents for centrifugal pumps that have been manufactured by the Krogh Manufacturing Company. At present an office is maintained at 421 Market street, but as soon as arrangements are completed the new firm will have offices at its factory in a different location.

The Mercantile Trust Company, of New York, recently began suit in the United States Circuit Court at Trenton, N. J., for the foreclosrure of the $15,000,000 mortgage on the properties of the United States Shipbuilding Company, which defaulted payment of $400,000 interest on July 1. The plants covered by the mortgage are those of the Union Iron Works, of San Francisco; the Bath Iron Works and the Hyde Windlass Company, of Bath, Me.; the Crescent Shipyard Company, of Elizabeth, N. J.; Samuel L. Moore & Sons' Company, of New London, Conn.; Harland & Hollingsworth Company, of Wilmington, Del., and the Canada Manufacturing Company, of Carteret, N. J. The Bethlehem Steel Works was not included in the properties covered by the mortgage.

The old firm of Thos. H. Dallett & Co., of Philadelphia, has lately been reorganized and incorporated as the Thos. H. Dallett Company, with officers as follows: President, Thos. H. Dallett, vice-president and general manager, Ernest C. Bliss; secretary and treasurer, E. C. Clay, with W. H. Van Sickel, formerly identified with the pneumatic tool industry as superintendent. The company will greatly enlarge the capacity of its plant at York street and Sedgley avenue, Philadelphia, and while continuing the manufacture of its belt and electrically driven portable drills, deck planers, etc., will devote especial attention to the production of Dallett pneumatic tools. The works are equipped with the most improved machinery, and the extensions projected are necessary to enable the company to supply the demand for Dallett tools.

TRADE CATALOGUES.

The Standard Tool Company, of Cleveland, O., is sending out illustrated mailing cards showing its new emery wheel dresser.

The Edson Manufacturing Company, of Boston, Mass., by a typographical error in a recent issue, was credited with making pumps having a capacity of 12 to 6,000 gal. per hour. The error is obvious. The smallest prospecting pump the company makes has a capacity of 1,200 gal. per hour.

The American Crude Oil Burner Company, of 713 Market street, San Francisco, Cal., installers of fuel oil plants, in Catalogue No. 3 gives a short treatise on crude oil burning and detailed information of its different types of boiler and chlorination furnace burners. Its Simplex fuel oil pumping system is described and illustrated and the advantages claimed over other systems are given.

The Turner Brass Works, of 42 N. Franklin street, Chicago, is distributing to the trade copies of its new 56-page catalogue of gasoline torches and other gasoline appliances. The pamphlet illustrates and describes the Old Reliable torches and Straight-Turner brazing forges favorably known to mechanics for several years and also the Turner gasoline bunsen light and manyscope, Franklin torch, crucible furnace outfits, pressure indicating pump and several new styles of double jet torches, shown in this catalogue for the first time. A full description of the Turner double jet torches is given explaining their underlying principles and why they produce twice the heat of ordinary gasoline torches.

Catalogue No. 19, published by the Jeffrey Manufacturing Company, of Columbus, O., is a finely illustrated folio pamphlet of 128 pages devoted to mining machinery, including coal cutters and coal drills operated by electricity and compressed air, electric locomotives for mine and surface haulage and complete electric power plants for mining properties. Special attention is given to the company's coal mining machinery. The company states that it is prepared to examine mines and furnish complete equipments for mining and power purposes, these equipments to be installed for utilizing either electricity or compressed air in coal mines, and including boilers, engines, dynamos, air-compressors, wiring, piping, undercutting machines, drills, electric locomotives, hoists, pumps, fans, etc., assembled as required and turned over to purchasers with machinery in operation. The various types of Jeffrey electric locomotives are fully illustrated and tables of dimensions, capacities, etc., are given. Various types of conveyers and elevating machinery, revolving screens, etc., are also described.

SPECIAL CORRESPONDENCE.

Butte. July 25.

(From Our Special Correspondent.)

Two out of the three divisions of the District Court of Silver Bow County are occupied with trying cases between the Amalgamated Copper Company and Heinze. Before Judge Clancy, of the Second Division, is being tried the Nipper Case, in which one side characterizes the now celebrated "Blue X" vein as a mud fissure and the other side claims it is the real thing in veins, the experts called on either side being equally positive and directly opposed in their views. In Judge McClerens' court the disbarment case of A. J. Shores, the leading counsel for the Amalgamated Company, is being tried. This is a case wherein Judge Harvey, of Division No. 1, Court of Silver Bow County, is seeking to have Mr. Shores disbarred for bribery in connection with what is known as the "Minnie Healey" case. Judge Harney claims that he was offered a bribe in connection with that case by Shores. It is well understood that Harney personally is not the one who is pushing the prosecution.

Word has just reached Butte of the closing of the Granite-Bi-Metallic Mine, at Phillipsburg, by attachment proceedings issued by the Walker Commercial Company, of Granite. The 400 men employed by the company are idle. The Walkes Company has been in the habit of cashing the checks of the company for the miners. The last batch of checks, amounting to $30,000, came back from the St. Louis banks protested for some reason, causing the Walker Company to bring the attachment for protection. The Granite-Bi-Metallic Mining Company has been one of the large going concerns of the State and was supposed to be prosperous. The headquarters of the company are in St. Louis, where it is largely owned.

A deplorable accident is reported from the new Washoe Smelter, at Anaconda, where a large force of workmen are building the connections to the long flue, which connects with the large stack. In hoisting material a large iron beam gave way and 20 workmen were buried under falling brick and iron. This is the most serious accident that has occurred at the works.

Butte interests are at a loss to account for the great slump in copper shares in the Eastern market. Conditions here do not seem to warrant such a falling off in the value of Amalgamated and the individual companies comprising that consolidation. The large holders of these shares in Montana are considerably worried and do not know where to place blame for the slump.

Denver. July 25.

(From Our Special Correspondent.)

The situation at the Grant and Globe plants, near Denver, of the American Smelting and Refining Company, remains practically unchanged, and the bulk of the ore usually treated there is diverted to Pueblo. Persistent rumors of an impending strike at the Eilers plant, Pueblo, were set at rest yesterday by a conference between the employes of that plant and the officials. The men expressed dissatisfaction with the present hours, but decided to abide by the outcome of the trouble in Denver. There are more than 1,000 men employed in the company's smelters at Pueblo, and since the strike at Denver organizers from different parts of the State have been working on the Pueblo men. The efforts of organizers to instigate strikes at the Leadville and Durango plants have so far failed.

An abortive attempt has been made by organizers to disturb the amicable relations between employer and employed which have existed since 1868 at the Argo plant, near Denver, of the Boston and Colorado Smelting Company. The Standard chlorination mill of the United States Reduction and Refining Company, at Colorado City, continues in full operation, notwithstanding the strike nominally declared by the local Millmen's Union, the employes being practically all non-union men.

Excitement continues over the recent reports of rich gold bearing ore near Waunita, in the eastern part of Gunnison County. Prospecting is being done over a wide area, and assessment work is in progress in scores of places. Inasmuch as the greatest development as yet is a 15 ft. hole, the question remains whether there is anything to justify the excitement. The geological formation is said to be favorable to the existence of gold bearing veins, and all the streams flowing from that particular watershed carry placer gold. The strike already made is conceded to be genuine, and the vein carries phenomenal values. Other prospects are said to show good values, but have not shown ore in place.

In 1901 the Colorado Legislature passed a revenue law providing, among other things, for the payment to the State by corporations of what is known as a "flat tax" of 10c. for each $1,000 of capitalization for foreign corporations and 5c. for domestic corporations. In 1902 an extra session of the same Legislature passed a new revenue law calling for a flat tax of 4c. on each $1,000 for foreign corporations and 2c. for domestic corporations. Judge Dixon, of the District Court, Pueblo, recently decided the law of 1901 to be unconstitutional on the manner of the passage of the measure through the Legislature. Judge Carpenter, of the District Court, Denver, in the case of the United States Reduction and Refining Company against ex-State Auditor Crouter for the refunding of flat tax paid by that company under protest, has also held the unconstitutionality of the law of 1901, and in effect orders the ex-State Auditor to repay the sums paid under protest. When Mr. Crouter retired from office he retained the amount which had been paid under protest to him by various corporations; consequently, the money now to be refunded does not come out of the State treasury. The State received $23,877 during Mr. Crouter's incumbency, which represented flat tax collected under the law of 1901 paid without protest, which the corporations forfeited their right to recover.

Judge Stevens, of the District Court at Ouray, recently declared unconstitutional that portion of the law of 1902 which provides that a corporation can neither maintain nor defend a suit until its flat tax has been paid. There are two further cases still pending on other phases of the question—one in the District Court, Denver, by the Attorney-General of Colorado against the American Smelting and Refining Company, to forfeit its franchise to do business in Colorado, on account of its not having paid its flat tax for the year 1902, amounting to $4,000. The other case, which has been transferred to the Federal Court, Denver, is by the Attorney-General against a railroad company. The whole question may not be finally passed on by the Colorado Supreme Court for some little time. The legality of the flat tax under the act of 1902 is yet to be determined, and may be carried to the United States Supreme Court.

San Francisco. July 21.

(From Our Special Correspondent.)

The strike troubles at Stent and Quartz, Tuolumne County, have been settled by a compromise. All underground men, except muckers, are to receive $3 for 10 hours' work and surface men of all kinds are to return to work at the rate of wages paid before the strike. This agreement, which was made by Mark B. Kerr on behalf of the mine owners, is to continue for six months. The Jumper, Golden Rule, Santa Ysabel and Mazeppa have again started up under this arrangement. Manager Kerr gave the union to understand that unless it guaranteed no further trouble for six months the mines would remain closed.

The 283-mile oil pipe line of the Standard Oil Company from the Kern River fields to Point Richmond refineries, on San Francisco Bay, is a success after all, the oil now coming into Richmond at the rate of 20,000 bbls. daily. The pumping of the oil began about two months ago and the progress through the new pipe was so slow that failure was predicted. No new pumping stations were found necessary, however. The refineries at Richmond will not be greatly extended. At present about 700 men are employed. The pipe line cost about $3,000 and the refining plant about as much more. If the oil comes too slowly in colder weather four more pumping stations are to be put in. Without counting the tanks at pumping stations, the pipe line itself holds about 100,000 bbls. of oil. Illuminating oil will be produced at the refinery as well as many by-products, coke being one of these specialties.

The Brown Bear Mine, at Deadwood, Trinity County, which has perhaps produced more gold than any single quartz mine in the northeastern counties, has been sold under execution for $31,000 to Mrs. M. A. Phillips, who had advanced that much on development work. Her former husband, Henry Martin, was one of the original owners, he being associated with John Melton and Chas. Waters. The original owners are all dead. The mill has run steadily for 20 years and a large amount of development work has been done, including several long tunnels. Waste from the old workings will now be run through the mill. Superintendent C. Dobler thinks other ore bodies may still be found in the mine, but it has not paid for some time.

The Associated Oil Companies have installed a plant to pump oil from wells in the Kern River field by natural gas fuel instead of oil. A plant of this nature, owned by the East Puente Oil Company, has proved successful. The natural gas flows into a gasometer and is thence supplied to the pumping engines. The new plant is on the Red Bank lease.

State Mineralogist L. E. Aubury has men in the field collecting California ores and minerals for exhibition at the St. Louis Exposition, including gold and silver, minor minerals, oils, quarry substances, etc. The State owns a fine collection on exhibition permanently at the State Mining Bureau, in the Ferry Building, San Francisco, but it is not thought desirable to break into this collection, and an entirely new one is to be made.

It seems some of the legal fraternity have discovered that certain laws, passed by the last Legislature, make many bonded mines liable for the debts incurred for development work by the parties bonding them, even if the bona fide owners post notices warning employes that they will not be responsible for debts contracted for such work by those holding the bond. Under this law the mines themselves can be held responsible for labor done upon them and the old form of notice affords no protection for the owners. This is a very serious matter, indeed, to mine owners, who will have to be very careful to whom they bond. In fact, if such a law is enforced it will prevent mine development to a great extent, as men will be loth to bond.

The Southern Pacific Company, which had given orders for the drilling of 35 more oil wells in Kern River and McKittrick districts, has canceled the order, having acquired large interests in some other companies already having a heavy production.

Spokane. July 24.

(From Our Special Correspondent.)

Saltese Camp, just across the line in Montana from the Coeur d'Alenes, is enjoying unusual activity. About 150 miners are busy. The Tarbox Company, a Wallace, Ida., corporation, is sinking on a galena showing and expects to be to the 400-ft. level by August 1. At the 225-ft. level a cross-cut showed from 8 to 15 ft. of concentrating ore.

An important strike is reported from the Deer Creek property, where a Philadelphia company has spent much money. In a long tunnel an ore body from 3½ to 4 ft. wide has been found that carries from $12 to $15 a ton in free gold.

Barney Layton, newly elected manager of the Sullivan Group Mining Company, owning a large lead property near Marysville, B. C., is expected here this week to take charge of the company's affairs.

The Last Chance Mining Company, operating the famous mine of the same name at Wardner, Ida., has been wiped out by the foreclosure of the mortgage bonds issued on the property. The Last Chance was the nucleus around which Charles Sweeny and F. Lewis Clark formed their Empire State-Idaho Mining Company. The Last Chance Company gave first mortgage bonds to the Empire State-Idaho and defaulted in the interest, which, with the principal and penalties, amounted to $530,833. The property was offered at sheriff's sale, and was bought by E. J. Roberts, manager of the Empire State-Idaho Company, for $485,758. This wipes out the Last Chance stock and makes the Last Chance part of the Empire State-Idaho.

Judge Morgan, of Shoshone County, Ida., has handed down a decision in the famous 16 to 1 case in favor of the Finch & Campbell interests, who were the defendants. The plaintiffs, Peter Bernier and associates, were given 60 days in which to perfect an appeal. There is no doubt that the case will be fought further. The Finch & Campbell interests own 3-16ths of the mine outright, and have an understanding with Anderson and associates, who own the rest, for the purchase of the entire balance. Finch & Campbell originally had the Anderson interests under bond for $500,000, but when the suit was brought by Bernier the price was reduced. Bernier claimed that the disputed ground was really covered by a prior location of his own, the Okanogan. The defense asserted that Bernier had moved his location posts on the Okanogan about 650 ft. north.

Negotiations are under way for a settlement of the difficulties between the county commissioners of Shoshone County and the big mine owners for the payment of the taxes for 1901. It is believed that a compromise will be reached. The companies have offered nearly $50,000 in settlement of their taxes, although the county demanded about $137,000. With the exception of the Hercules, all of the large mines of the district are involved.

James Cronin, who, with John A. Finch, was working the Quimby Creek property in Trinity County, Cal., under bond, has thrown up his option and has returned to Spokane. He will at once resume work on the St. Eugene, at Moyie, B. C. A zinc concentrator will be added to the equipment of the plant.

About 8 miles from Buffalo Hump, Ida., is the Hogan Group, owned by the Hogan Brothers, of Butte, who comprise the Crooked River Mining Company. The owners are enlarging the mill to 40 stamps. They announce that they are treating about 80 tons of ore a day through a 20-stamp mill. All the ore is broken down by three men working one shift in an open pit, which opens at the bottom into a tunnel, through which the ore is trammed. Reliable mining men who have seen the property say that the cost of mining and milling does not exceed $1 a ton.

Victoria, B. C. July 23.

(From Our Special Correspondent.)

The outlook in the Boundary has greatly improved in the last few weeks. Four furnaces of the Granby Smelter are in commission and a second furnace at the Boundary Falls Works has been blown in. It is estimated that the number of miners and smeltermen now employed exceeds 11,000. Meanwhile Mr. Tonkin, the manager of the Crow's Nest Company, asserts that the smelters henceforward will have little cause to complain of short fuel supply, as the collieries are steadily increasing their output. At Coal Creek the mines are in perfect working order, all the damage done by the disaster in May, 1902, and in the strike early this season having been repaired. The coal output for June was as follows: Coal Creek, 24,586; Morrissey, 18,124; Michel, 28,543, a total of 71,253 tons. Coke shipments were 6,568 tons from Fernie and 6,657 from Michel; total, 13,223 tons. The disposition of the coke was: Canadian Smelting Works, Trail, 3,146 tons; B. C. Copper Company, Greenwood, 1,902 tons; Granby Company, Grand Forks, 4,799 tons; Hall Mines, Nelson, 363 tons; Montreal & Boston Company, Boundary Falls, 1,771 tons; Northport Smelter, 1,244 tons. It is estimated that the total coal shipments for July will be about 85,000 tons. At Morrissey 48 of the new coke ovens are now in brick, and all the stone work has been completed. All will be ready for work in September, but it is intended to start the ovens as fast as completed. At Michel 60 ovens are in brick and the balance have the stone work done. At Fernie, for the first time, all the ovens, 442, worked during the latter part of June. Morrissey Mines, the new town, is growing rapidly, and everything points to a prosperous summer. Since the settlement of the strike there has been no friction between the miners and the management. Owing to the rapid development the demand for miners is increasing more rapidly than the supply.

The Canadian Smelting Company, at Trail, is arranging to refine all the lead required for local consumption in Canada, about 13,000 to 15,000 tons annually. Lead matte produced in excess of the amount required will probably be handled as now. The company also is considering establishing a plant for the treatment of zinc ores from the Slocan and other Kootenay districts. It is investigating in the field and experimenting with magnetic separation at its works.

The properties of the Queen Bess Proprietary Company, an English company in the Slocan District, were sold last week at sheriff's sale to satisfy bank judgments. They were the Crown-granted mineral claims Queen Bess, Young Dominion, Concord, First Extension and American Girl, situated near the town of Three Forks. The Tiger, Deadwood, Bland No. 2, Howard Fraction and Tiger Fraction, owned by the Slocan Lake Gold and Silver Mines, Limited, also went at sheriff's sale. Both groups were bought in by the Bank of Montreal, the Queen Bess, which at one time made a profit, realizing only $6,500.

Excellent reports continue to come from the Ymir and Erie districts, the former now having five productive mines, the Ymir, Wilcox, Hunter V., and Atlin. The Ymir Company recently issued a circular to shareholders describing the condition of the mine and speaking very hopefully of its future. The Wilcox Mill has had another successful run, and it is stated that the appearance of the stopes in the Fourth of July vein shows great improvement. A new mill is to be built on the Pilot group of claims. Several properties in this section have been bonded lately, including the Gold Cup, by Washington men.

At Nelson work has started on the Roderick Dhu Mine and will be resumed at the Molly Gibson, where a concentrator is to be built.

In Trout Lake, it is stated that in addition to the concentrating plant to be installed for the Silver Cup and Nettie L. mines, a chloridising plant will be added for extraction of the gold and silver values from the concentrates. The second-class dumps of the Silver Cup for instance will average $9 in gold, 8 oz. silver, 10 per cent zinc, and 5 per cent lead, so that by concentration good values in gold and silver will be obtained, and by chloridising the remainder, the extraction will probably be 85 per cent of the total gold and silver contents of the ore; 200 tons of salt have been ordered for the chloridising plant.

San Luis Potosi. July 22.

(From Our Special Correspondent.)

In the Territory of Tepic a large power plant is to be erected on the Santiago River at the Falls of Tepic to furnish light and power to the cities of Tepic, San Blas and Ixtlan, and the camps of Campostela, Santa Maria del Oro, Yequs and Santiago. Near the last named camp R. W. Wallace has sold his mining interests to an American company for $350,000 gold.

In Oaxaca Texans are exploring some 20 pertinencias recently purchased by them in the District of Zuictlan, 17 miles south of Ocotlan.

In Michoacan a strong company from the City of Mexico has been formed to open up the coal fields about 40 kilos. from Maravatio, near Agustitlan. It is understood some 10 or 12 men are interested, and have over 12,000 acres of what is said to be excellent coal lands. Coal in the city is now selling at $24 per ton. In the southern part of the State, J. D. Wyman is grading a road to his copper mines, and on its completion will begin shipping. The Santiago y Anexas properties, owned by W. W. Graham, have been sold for $250,000 Mexican.

At El Oro, in the State of Mexico, the Guggenheims and the Venture Corporation have obtained control of La Esperanza by agreeing to pay $4,500,000 Mexican for the property. Negotiations are pending for the purchase of the Colon Mine, on the Dos Estrellas vein, at $1,500,000, by Americans. The Descubridora Mining Company, with a capital of $360,000 Mexican, and the Anistad Mining Company, with $450,000 Mexican capital, are two new companies, organized to work in El Oro by Americans in the City of Mexico, with J. C. Mordaugh as treasurer of both and president of the Descubridora. La Amistad has already ordered $30,000 worth of new machinery.

At Tasco, in Guerrero, on a branch of the Mexican Central from Naranjo, the old mines said to have been worked by Cortez are being opened, producing ore running as high as $75 silver per ton. Pedro Flores has just finished a 50-ton custom mill. The Rosario Company has struck a large body of ore, and is putting in a 40-ton mill.

In Sonora the Cananea Copper Company reports a new strike in the Oversight Mine on the Capote lode. It is stated that the smelting capacity, now 1,000 tons a day, will be doubled. In the meantime 250 tons a day of the best ore are shipped to El Paso.

Exchange on New York during the week varied around 234@234½, closing on July 18 at 235. The stock market was more active than for a number of months, the most notable feature being the way stocks of the new companies in the District of El Oro were sought. The Bessie, with only $10 paid in, sold at $35; Victoria, with $20 paid, sold at $480; Old Abe, $10 paid, sold at $77; Union, $20 paid, at $80; Progreso, $20 paid, at $70; Noche Buena, $10 paid, at $24, and Antares, $10 paid, at $70. All are of $100 par value. Of the other stocks sought Monterey Iron

and Steel brought $111½; Dos Estrellas, El Oro, $3090; Cinco Senores, $195; La Paz, Matehuala, $690; Trinidad, of Charcos, San Luis Potosi, $170; Aldebaran, $137; Providencia, San Felipe, Guanajuato, $162; Soledad, $475; Santa Rosa, El Oro, $125; San Rafael, $1425; Luz de Borda, $105, and Sorpresa, $335.

London July 18.

Details of the new move of the Smelting and Refining Company of Australia, Ltd., have been published this week. This is the contract to smelt for a period of seven years the output of the nickel mines in New Caledonia, belonging to the Société Generale d'Exploitations Coloniale, of Paris. These mines are estimated to produce 50,000 tons of 6½ per cent ore for 10 years at least, with a possibility of their life being much longer. At the present time only one group of claims, the Kone-Voh, is being worked, and as the Société owns many more nickel properties in the island of considerable prospective value, the outlook seems very promising. In order to open up the mines, and place the smelting contract on a business basis, a new company has been formed called the Consolidated Nickel Mines, Limited, with a capital of £400,000, of which £126,000 will be available for working capital. The output of refined nickel is intended to be about 3,000 tons per annum, and the profits are to be divided equally between the new company and the Smelting and Refining Company of Australia. When the latter company was reorganized by Mr. Blow and his friends two years ago, I suggested in these columns that the smelters would be available for ore from New Caledonia in case difficulties were met with in looking out for custom ore in Australia. My suggestion has turned out to be a practicable one, and the move should be a profitable one all round. This new move has had the effect of sending up the price of the shares of the Smelting and Refining Company with a bound.

The "gold dust" fraud has broken out again in England. This time it is a gang of Russian Poles that have been deluding the simple-minded English people in the east end of London. The story they tell is that the gold dust is sent over by an overseer at the gravel mines in Siberia, that are worked by convicts. This stolen gold used, so they say, to be bought by a receiver regularly, but he is now dead and they are looking out for a new channel for disposing of it. The price quoted is 33 per cent off standard gold. After the gold is bought it is found to be nothing but brass filings. Quite a number of people have been victimized in this way, though how most of them would be able to dispose of their purchase, had it been real gold, without exciting suspicion, is not quite clear. The organizers of this swindle relied on the fact that the victims would not care to have their share in the transactions known, as they were intending to place themselves in the position of receivers of stolen goods. The police have, however, got wind of the affair and laid the swindlers by the heels.

The Nile Valley Company has, after all, been able to obtain Mr. J. B. Robinson's support in its reconstruction. It will be remembered that when Mr. Robinson originally agreed to provide new capital the Egyptian Government did not approve of the scheme, as the other shareholders were not subscribing any more funds. When a revised proposition that suited the Egyptian Government was outlined, Mr. Robinson declined to subscribe, as the terms offered to him were not so favorable as those offered to the other shareholders. For a time the negotiations dropped, but the directors have wisely reopened them, with a view of finding some scheme that will please the Egyptian Government, Mr. Robinson and the other shareholders. Their efforts have been successful, and a new proposition has been drafted. The new company is to have a nominal capital of £250,000 as before, and shareholders are to have four new shares in exchange for each one held at present. Mr. J. B. Robinson is to subscribe for 20,300 shares at par and to have the call on 47,000 at 30s. each; that is, at 50 per cent premium. The United African Explorations, Limited, the parent company of the Nile Valley, is to subscribe for 20,300 new shares, a similar number to Mr. Robinson. The new company will thus start out with £40,600 cash capital. This proposition seems to be an eminently reasonable one and it is to be hoped that it will be finally acceptable to all parties concerned.

The proposed amalgamation of the Mount Lyell Mining and Railway Company with the North Mount Lyell Copper Company, that has been discussed for so long a time, has at last been agreed to. The scheme was all along agreeable to the former company, but a section of the English shareholders of the North company have strenuously opposed it. Their argument is that their ores are of good grade, whilst the payable ores of the Mount Lyell are practically exhausted, and another reason for oppossition is the transference of the location of the company to Australia, in spite of the fact that two-thirds of the shares of the North company are held in England. The opposing shareholders are, however, in a minority, and the amalgamation proposals have been agreed to. For my own part, I consider the scheme a very good one. The Mount Lyell Company has plenty of funds and its ore is becoming exhausted. The present deal is practically a purchase of a new property. The North company has ore, but is heavily in debt; besides which the force of circumstances had prevented the treatment of the ore at a profit. With Mr. Sticht as director of the metallurgical operations of the new company, which position he has agreed to hold for five years, there is no doubt that North shareholders will reap great benefit by the amalgamation.

GENERAL MINING NEWS.

The Pennsylvania Railroad Company reports the coal and coke tonnage originating on its lines east of Pittsburg for the year up to July 18 as follows, in short tons:

	1902.	1903.	Changes.
Anthracite coal	1,608,331	2,499,368	I. 891,037
Bituminous coal	13,832,331	14,882,366	I. 1,050,035
Coke	5,320,750	5,428,259	I. 107,509
Totals	20,761,412	22,809,993	I. 2,048,509

The tonnage for the week ending July 18 was: Anthracite, 85,566; bituminous, 596,243; coke, 206,212; total, 888,021 tons.

ALASKA.

High water prevails on the lower Yukon River this year and navigation is easy on the Koyukuk, Tanana and tributary streams.

PRINCE OF WALES ISLAND.

Brown-Alaska Company.—This company, of which Samuel I. Silverman is manager, is erecting a smelter on the east end of Prince of Wales Island. About 450 men are now clearing the site. The company expects to have the smelter ready by December 1.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Company, Limited.—The production for June was 487 tons (2,000 lbs.) of copper. The small production is due to the fact that the works were closed during the earlier part of the month in consequence of labor troubles, which are now at an end.

MOHAVE COUNTY.

(*From Our Special Correspondent.*)

Altata.—A new body of gold, silver and copper ore has been opened up in a drift on the 75-ft. level of this mine, near Chloride. The mine is being worked under lease by Schemmelpfennig & Dryden.

Elkhart.—This mine, at Chloride, which has been closed since July 30, is about to be worked under a bond and lease by a new company, which will sink the 600 ft. shaft to 1,000 ft.

Tinto.—Wm. Miller has sold a half interest in this gold mine at Chloride to Hawks & Shaefer. The new owners have installed a horse whim and will sink the 90-ft. shaft 110 ft. deeper and drift in both directions on the vein, shipping the product to smelters.

Tennessee.—Work in the 700-ft. drift on the 500-ft. level of this mine at Chloride was stopped recently.

CALIFORNIA.

ALAMEDA COUNTY.

James.—A. C. James has 15 men at work on his manganese mine at Red Mountain, near Livermore. In the district are deposits of manganese, quicksilver and magnesite.

Phoenix Mining Company.—This company, which owns the quicksilver mines in the San Antonio Valley, near Livermore, has struck a large body of low-grade cinnabar ore in its 1,200-ft. tunnel at 420 ft. depth. The mines are owned mainly by Alvinza Hayward and the Newhall Brothers. A furnace is under construction.

AMADOR COUNTY.

Butte Basin.—Work is to start on this gravel mine, near Jackson, W. E. Stewart superintendent. The shaft is to be sunk 40 ft. deeper.

Del Monte Mining Company.—At a meeting held at Jackson these directors were elected: F. A. Voorheis, Geo. Wright, Richard Webb, D. C. and C. O'Neil. Work on the tunnel for the present has been stopped and some 300 tons of ore on the dump will be crushed.

Kennedy Mill and Mining Company.—From this company's mine, at Jackson, J. F. Parks superintendent, the last clean-up from the 70 stamps showed a better average yield than at any time in the past two years.

Sand Pile.—At this tailings claim, at Forest Home, owned by D. Fricot & Co., of Angels, the company is putting up cyanide works to treat materials accumulated from the working of the Plymouth Consolidated Mills.

BUTTE COUNTY.

Big Bend Tunnel and Mining Company.—This company's property, on the north fork of Feather River, has been deeded to the Eureka Power Company, of Oroville, which is to establish a power plant there. The Big Bend tunnel was one of the largest river-bed mining operations ever planned in the State, but was a failure and has been idle many years. Over $1,000,000 were spent on the enterprise.

CALAVERAS COUNTY.

Gwin Mine Development Company.—This company is about to give up the use of traction engines for hauling freight between the mine and the railroad station at Valley Springs because teams can now be secured reasonably.

Rooney.—At this mine, in Chile Gulch, grading for the 3-stamp mill is in progress. The pump and mill machinery are on the way.

Stockton Hill.—At this mine, at Mokelumne Hill, Col. Robinson superintendent, an old 80-ft. shaft is to be utilized as an oil tank, when lined with redwood. A tunnel connectiag with the shaft carries the service pipe. The oil will run by gravity to the furnaces.

Sunrise.—A 6-stamp mill is to be put in at this mine, near Railroad Flat.

EL DORADO COUNTY.

Little Gem.—This mine, in Volcanoville District, has been leased by Senator Chapman, who purchased the machinery upon it.

KERN COUNTY.

The mines in the vicinity of Mohave are employing about 200 men. The Exposed Treasure is getting good returns. The Echo has just enlarged its plant and the Karma and Queen Esther are both enlarging their reduction facilities. Other mines are doing development work. The water pipe line from Cameron, 18 miles distant, is not completed.

NEVADA COUNTY.

Nevada County.—The miners holding the bond on this mine have resumed work.

Oustomah.—This mine (formerly the Pennsylvania), near Nevada City, is being reopened and a 3-ft. ledge of good ore has been found on the fifth level north.

Peabody.—The North Star Mines Company, of Grass Valley has relinquished its bond on this property, as Mr. Christopher declined a further extension of time. He expects to resume work in about three months.

Posey.—At this mine, near Nevada City, W. H. Bray superintendent, a modern 10-stamp mill is being erected. The mine is being opened systematically.

PLACER COUNTY.

Holmes Lime Company.—Patent iron kilns have been put up at this company's new lime quarry, at Colfax, and 12 tons of lime daily will be shipped.

Sacramento Dredging and Mining Company.—The new dredge to be used near Colfax has been completed and will soon be shipped from Sacramento.

Southern Cross.—President R. J. Trimble is making arrangements to erect a 20-stamp mill on this mine, near Towle.

SAN BERNARDINO COUNTY.

Ludlow.—This company expects to begin shipping ore over the new branch railroad shortly.

Woodstock Mining Company.—Walter A. Liming, superintendent, states that developments warrant the building of a mill near Bagdad.

SAN DIEGO COUNTY.

National Smelting and Refining Company.—This company is about to build a 100 by 30 ft. structure over a smelter already set up for installing other furnaces. An assay office building is also to be erected.

SANTA CLARA COUNTY.

Silver Creek Mining Company.—This company has purchased from E. M. Piercy 369 acres of land near Evergreen, supposed to be rich in deposits of cinnabar ore.

SHASTA COUNTY.

Great Western.—This St. Louis company has elected the following officers: T. S. Henderson, president; O. E. Adams, vice-president; P. N. Noel, secretary and treasurer; E. F. Adams, M. E. Dittmar, Thos. Walsh and C. P. Keller, directors.

Jim Loage.—This mine, at Centerville, 15 miles from Redding, has been sold by Nelson Waite and F. H. Robertson to P. Slaugh and W. F. Aram.

Marina Marsicano Mining Company.—This company, operating at Ono, has 15 men doing development work under superintendence of L. F. Barlow. The company has a cross-cut tunnel 1,100 ft. long and an extension of 650 ft beyond the ledge. A drift 350 ft. has been run on the low grade ore-body. The workings are 350 ft. below the old workings of the Bell Brothers.

McClure.—The Mount Shasta Gold Mines Corporation has made another payment on the option (or $16,000 in all) on this group of copper claims near Winthrop.

Spanish.—On this mine, in Lower Springs District, near Redding, idle for years, Mr. B. M. Newcombe, of Oat Hill, has resumed work. S. Davis will be superintendent. There is a good mill and pumping plant on the property.

SIERRA COUNTY.

Gold Canyon.—This quartz mine, on the Middle Yuba River, between Alleghany and Moore's Flat, has been bought by the managers of the Oriental Mine, Alleghany, and a plant is to be erected.

Lassiat Gold Mining Company.—This company has been incorporated to work a mine at Poker Flat. The directors are John B. Lassiat, Frank P. Roddy, Agnes Roddy, Rosalie Lassiat and Frank Humbert, all of Poker Flat.

Tabor.—Fine paying gravel has been struck in this mine, at Gibsonville. A new electric plant is being installed.

SISKIYOU COUNTY.

Surveying work has begun on the proposed ditch to bring water from Scott River to the claims near Hamburg Bar, recently bonded by a Colorado company.

Highland.—Very rich rock is coming from this mine, on Salmon Mountain.

TRINITY COUNTY.

Brown Bear.—This mine, at Deadwood, has been sold by the sheriff to Mrs. M. A. Phillips, one of the original owners, for $31,000, the amount advanced by her for development work.

Egan Flat.—H. E. Pickett, of Placerville, El Dorado County, is to prospect this mine, at Junction City, with a Keystone drill, and if prospects are favorable a dredger will be put up.

General Lee.—This mine, on West Weaver Creek, John Isbell, superintendent, is an extension of the Potillo and is yielding good free gold ore.

Potillo.—This mine, on West Weaver Creek, Frank Potillo, superintendent, has a 20-in. ledge of very good ore.

Three Brothers.—This group, at Deadwood, is being developed by seven tunnels. The lower tunnel is expected to tap the lode at a depth of 1,000 ft.

TUOLUMNE COUNTY.

Golden Gate.—This property, at Sonora, recently closed down, has been running steadily for the past 15 years. The plant is a complete one and about $1,700,000 is supposed to have been taken out of the mine. On the proposed reorganization of the company the 700-ft. shaft will probably be sunk to 1,200 ft.

COLORADO.

CLEAR CREEK COUNTY.

Cedar Ridge Mines and Tunnel Company.—At the recent annual meeting the following officers were elected: J. B. F. Pierson, of Kenton, Mich., president; J. M. Sterling, of Bridgeport, Conn., vice-president; W. A. Kalp, of Mt. Pleasant, Pa., secretary and treasurer, and H. A. Moore, of Idaho Springs, manager. The company has the Coming Nation claim, on Sante Fe Mountain, near Idaho Springs.

Idaho Springs Reduction Company.—The new mill is running satisfactorily. At a recent meeting the following officers were elected: D. McDonald, president; W. R. Strasser, vice-president; B. F. Strasser, secretary and treasurer; John N. Isgrig, manager, with B. F. Lowell and B. N. Meyers, directors.

(*From Our Special Correspondent.*)

'94 Tunnel.—Additional machinery is being placed in the mill—a dry process concentrator, which thus far has proved quite satisfactory. The usual saving is given as 85 to 93 per cent. G. W. Possell, of Alice, is in charge.

Alpine Consolidated Gold and Silver Mining Company.—Manager Thos. B. Crow has bought for the company the Smith Mill, 75 tons capacity, within the city limits of Idaho Springs. It will be used for treating ore from the Alpine Mine as soon as some changes are made. The price is said to have been about $25,000.

Burns-Moore Tunnel.—Work is resumed, from 5 to 6 ft. per day being driven with only one shift. The plant is operated by water power.

Consolidated Gem Mines.—The upraise from the Newhouse tunnel has been cleaned out, and work will be resumed shortly. Practically no work has been done on the upraise this month, owing to the recent cave-in.

Indiana.—A rich strike of gold ore is reported in this group on McClellan Mountain.

Jo Reynolds.—About 25 men are employed, mostly on development. Ore is shipped from only one stope. About 100 tons of mineral are shipped monthly, the values ranging from $30 to $40 per ton.

St. Paul.—A strike recently in some of the older workings is reported running 5,817 oz. in silver. Considerable water has been encountered, but not enough to seriously interfere with work.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gauntlet Gold Mining Company.—Iowa men interested in the Gauntlet group, on Quartz Hill, have opened some nice-looking yellow and gray copper ores in the 350-ft. east level. L. D. Hobson, Central City, is manager.

Hampton-Consolidated Mining Company.—Denver men owning this property in Russell District are preparing to resume work on an extensive scale and intend installing machinery. The property produces enargite ores, which are handled at the concentrator and the smelter. N. C. Hughes, Central City, is manager.

Kansas.—Phil Mixsell, of Denver, has interested Englishmen in this and other properties formerly operated by the Gold Coin Mining Company, and has given a contract to McFarlane & Co., of Central City, for overhauling the machinery on the Kansas shaft. James C. Fagan, of New Jersey, is at the head of the enterprise, the same parties being interested in the United States tunnel property. The Kansas shaft is reported to be 1,400 ft. deep and it is given out that the company intends to sink and then make connections with the tunnel, the distance to be covered being close to 3 miles. The tunnel will cut the property between 1,500 and 1,600 ft. depth. A new 1,600-ft. cable has been ordered. Phil Mixsell, Central City, will be in charge.

Orado Gold Mining Company.—In the 300-ft. east level some nice-looking smelting ores have been opened. Shipments of ores sent by leasers gave returns of $62 and $41.05 net to the ton for first and second classes, and the milling ores average 3 oz. gold to the cord. A. Skeels, Central City, is manager.

Pittsburg Consolidated Gold Mining and Tunnel Company.—Pittsburgers interested in a lease and bond in the Gold Dirt group near Perigo are figuring on the purchase of the property and may sink a new shaft east of the present workings, erect a stamp mill and put up boarding houses. The shaft is down 600 ft., and some good ores are being taken out. W. H. Knowles, Rollinsville, is manager.

Progressive Mining and Investment Company.—A small plant of machinery has been put up on the East Leavenworth Claim. The shaft is down 80 ft., and will be sunk 100 ft. deeper. Denver and Eastern men are interested, with W. H. Richards, Nevadaville, in charge.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

The production remains at 2,600 to 2.700 tons daily of all classes of material. The smelter agitation in Denver and Pueblo is responsible for a curtailment of shipments. The Arkansas Valley plan is running full force, and it is believed that the protest of leading citizens against outside agitation and the promise of protection to workmen had much to do in averting trouble here.

Leadville Zinc Production.—A slight increase in shipments is noted, with the outlook favorable for a heavier tonnage. The Iron Silver Mining Company has made contracts for all its zinc and zinc-lead ores, which will go principally to the Empire Zinc Company, at Canon City, and the Cherokee Lanyon Company, in Kansas, while its special grades will go to the United States Reduction Company. This will mean 4,500 to 5,000 tons a month of various classes of zinciferous ores alone.

California Gulch Mining Company.—At a recent stockholders' meeting it was decided to try to resume operations.

Coronado-Midas.—Following the completion of the 950-ft. drift between the Midas and the Coronado, the upraise in the Midas connecting the shaft with the drift has been completed. The iron shoot extends from the Coronado shaft, on East Seventh street, to the Bon Air, on East Second. Shipments are 125 tons daily.

Dolly Mining Company.—Negotiations are pending for a resumption.

Ella Beeler.—Development work on the Ella Beeler and Clear Grit properties, conducted by C. J. Moore, is progressing. A new tunnel being driven has opened a vein, from which some ore is shipped occasionally.

Fanchon.—Three sets of lessees are working on this property, and about 10 tons daily of good grade ore are shipped.

Gilt Edge.—The new machinery is in place on No. 1 shaft.

Gold Basin.—Occasional shipments are being made of rich gold ore, and drifting and upraising is being continued.

Louisville Group.—The new owners, Reynolds & Hanifen, while mining some zinciferous ores, are figuring on driving a 400-ft. lateral to connect with the Yak Tunnel.

London.—The roads are open so that regular shipments can be made. The tonnage will be 300 to 400 tons of ore a month, averaging $100 to $500 a ton. The past six months have been spent in development and large ore bodies are blocked out.

Phoenix Mining Company.—This company is shipping 125 tons a day, and is preparing to work below with a diamond drill and prospecting for the continuation of the old manganese deposits.

Yankee Blade.—In this Dewey section property 4 ft. of good ore have been opened by a recent strike, and the management is preparing to ship.

LARIMER COUNTY.

Mount Zirkel Copper Mining Company.—This company's property, consisting of 69 acres and a 15-acre mill site, near Pearl, is equipped with a shaft house and machinery. The main shaft is about 300 ft. deep, and several levels have been run, the ore carrying copper, silver and gold. The officers are: M. A. Maguire, of Chicago, president; E. B. Borssat, of Chicago, secretary and treasurer; L. D. Godshall, of Denver, general manager.

Pearl Mining and Milling Company.—This Iowa company is operating the Swede group of eight copper claims near Pearl. An 80-h. p. boiler, a 10 by 12 hoist and a No. 7 Cameron sinking pump are now being installed. A 2-compartment shaft is down 175 ft., with a 67-ft. crosscut run from the bottom. Regular shipments are to begin soon to the Encampment Smelter. T. J. Riley is manager.

TELLER COUNTY—CRIPPLE CREEK.

Cripple Creek Geological Survey.—Work progresses. Mr. Lindgren and his associates are busy. It is understood that the work will not be completed until late in the fall and the reports will not be issued for some months after.

Doctor-Jack Pot Consolidated Company.—The directors at a recent meeting elected the following officers: A. E. Carlton, president; Warren Woods, vice-president; F. M. Woods, secretary and general manager, and J. H. Hobbs, treasurer.

(*From Our Special Correspondent.*)

Doctor-Jack Pot.—From all accounts the strike recently made on the 500 ft. level of the Elizabeth Cooper claim is developing well. Considerable ore has been shipped from this property for some time.

Elkton Consolidated Gold Mining Company.—The reports of the officers show the company to be in a fair condition, though much better than a year ago. Since September the mine has paid all expenses. Considerable ore has been shipped by the company and by lessees. The Wright lease on the Thompson claim shipped 8,000 tons of ore. No ore was taken from the lower level, but it is expected that it will not be many months before this ground is drained by the tunnel.

Golden Cycle Mining Company.—At the meeting in Colorado Springs the majority voted about 808,000 shares and the minority about 556,000 shares. A resolution was introduced to cancel the contract between the company and L. E. Hill, allowing the latter to hoist material through the Cycle shaft from his lease on the Theresa, but this was voted down. The head office of the company was changed from Denver to St. Louis and a number of changes were made in the by-laws. It was reported that the factions of the stockholders had reached a compromise, but the result of the meeting shows this was a false report.

Isabella Gold Mining Company.—A three years' lease has been granted on the property to J. S. Murphy and C. C. Hamlin. Work will start at once. One or two other lessees are busy. No work is done on company account.

Mary McKinney Mining Company.—This property, that closed a short time for repairs, is about to start again. At a recent meeting of the stockholders the old directors were re-elected with the exception of G. L. Keener, who resigned. His place was taken by L. F. Castello. David Buckles is in charge of the mine temporarily. The company is installing a Crane washer.

Portland Gold Mining Company.—The company has paid its regular quarterly dividend of 3 cents per share. The mill is running after a shut down of about two weeks for some changes.

Proper.—Considerable ore is being shipped from the Vincent lease on this property, owned by the Stratton Cripple Creek Mining and Development Company, and worked under lease by Mr. Vincent and associates. The mine resembles a quarry. On the adjoining block King and associates are busy.

Stratton's Cripple Creek Mining and Development Company.—Leasing of blocks of this company's property on Gold and Globe hills is progressing. A number are leased and more are being let every week. Nothing has yet been done toward leasing the Bull Hill blocks.

Wild Horse.—Very little work is in progress at this mine on Bull Hill. Preparations are being made for a lawsuit against the Londondery property, adjoining ground, the Wild Horse claiming the right to follow the vein on its dip into Londonderry ground on account of apex rights. Considerable ore has been taken from the disputed territory, but it has been kept separate so that the money can be turned over to the rightful owners.

IDAHO.

IDAHO COUNTY.

Le Roy.—A contract for 350 ft. of tunneling on this group of mines in the Ely City District is reported let recently by Col. W. M. Plummer, of Spokane, Wash.

NEZ PERCES COUNTY.

Big Buffalo.—This group, near Buffalo Hump, is being developed by a tunnel, which is to be driven about 4,000 ft. About 25 men are employed. Charles Sweeny, one of the owners, has charge.

SHOSHONE COUNTY.

Golden Chest.—A deal is reported pending for the purchase of this property, near Murray.

Granite & Allie Mining Company.—Work has been resumed. The 10-stamp mill and cyanide annex are busy.

New Jersey Mining Company.—This company is building a 10-stamp mill on its property, near Wardner. It has also decided to put in an electrical cyanide-amalgamating plant and is about to let contracts to Robert Graner. The officers are: H. E. Gentor, of Du Bois, Pa., president; W. J. Doust, treasurer, and J. H. Tilsley, secretary.

INDIANA.

CLAY COUNTY.

(From Our Special Correspondent.)

Miami Coal and Mining Company.—This company has absorbed the Brazil Mining Company, which owns the village Ehrmandale and the Nickel Plate Mine.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

International Harvester Company.—Four thousand acres of coal land in Hayden Township have been purchased by this company and the deeds taken in the name of J. K. Deering, of Chicago, as trustee. The purchase price was $200,000. Several shafts will be sunk to supply fuel for its manufacturing plants.

MARYLAND.

FREDERICK COUNTY.

Liberty Copper Mining and Milling Company.—This company's plant, at Woodsboro, was offered at public auction recently by the receivers and withdrawn at a bid of $1,000.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Baltic.—The permanent hoist at No. 4 shaft is completed and will go into service in a few days.

Calumet & Hecla.—The Gardner property, 400 acres of mineral land, west of the Tamarack Mine, in T. 56, R. 33, has been purchased by this company from the estate of the late Joseph Gardner for $22,000.

Centennial.—A spur track of the Copper Range Railroad has been completed to "A" shaft, giving rail connection with the Arcadian Mill, at Grosse Point. It is expected that rock shipments will begin within two months.

Isle Royale Consolidated.—Sinking in No. 2 shaft will be resumed in a short time. The mine and stamp mill are employing 275 men.

Rhode Island.—A winze is sinking in the Pewabic amygdaloid lode from the 1,000-ft. level of No. 2 shaft. The formation carries some copper.

St. Mary's Mineral Land Co.—A diamond drill has been put to work south of the Winona Mine. Several holes will be put down to locate the southern extension of the lode opened at the Winona.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Metals Recovery Company.—Operations on the tailings from the old Central stamp mill have been discontinued and the plant closed. The sands did not yield the amount of copper expected.

Mohawk.—This company has ordered a 60-drill air compressor from the Ingersoll-Sergeant Drill Company, of New York, through Thomas F. Lynch, of Chicago. A carload of Wilfley concentrating tables from the Mine and Smelter Supply Company, of Denver, Colo., has been shipped.

Phoenix Consolidated.—The stamp mill is nearly completed and will go into commission late in August. It will stamp 150 or 200 tons of rock per day. Development work underground is progressing steadily.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure Consolidated.—This company has filed a report covering operations for 1902 with the county clerk. It has 1,100 stockholders.

Michigan.—The Minnesota conglomerate lode has been opened by cross-cuts at the eleventh and thirteenth levels. The formation shows considerable copper.

MINNESOTA.

(From Our Special Correspondent.)

Shipments of ore from Minnesota mines continue heavy, though many mines are falling off. The decline is more noticeable in the case of mines that ship over the Great Northern than in those shipping via the Duluth & Iron Range or the Duluth, Missabe & Northern. This means that independent shippers are curtailing their output, while the mines of the United Steel Corporation continue busy. But even the biggest shippers may be through unusually early.

The Minnesota Mining and Manufacturing Company has been organized to take over the so-called corundum deposits on the north shore of Lake Superior at Carlton Peak. This company is installing a plant near Baptism River for crushing the quarried rock. A half mile of cable way will convey the rock from quarry to dock. The company plans to put in a manufacturing plant at Duluth.

MESABI RANGE.

(From Our Special Correspondent.)

An 80-acre tract in the E. ½ of the S. E. ¼ of Section 6, T. 57, R. 20, has been bought of the original lessees by the Minnesota Iron Company. It is a State lease and carries a total royalty of 35c. a ton. It will not be opened at once.

Considerable exploration is under way close to Biwabik. E. J. Longyear has four drills near Embarras Lake and the East Biwabik Iron Company has three or four more on its lands on the old town site of Merritt.

Biwabik.—At this property shipments will probably be much greater than ever. Four shovels are working in ore and the large centrifugal crusher is busy day and night. The daily output is above 6,500 tons and the mine will be in the 1,000,000-ton class for the first time. The last work with the steam shovel in stripping was at an exceptionally low cost.

Duluth.—This mine is being stripped more heavily than ever; the present work is near No. 3 shaft, joining the Canton Mine, which has been idle since 1896. There is now nearly half a mile of exposed workings and it is separated from the Biwabik on the east by a slight mound of earth.

Holland.—This new property, in Section 4, T. 58, R. 16, has asked bids for stripping. About 150,000 cu. yds. are to be moved. There are 35 to 38 ft. of surface and the ore is from 40 to 75 ft. thick. About 1,000,000 tons have been shown, averaging about 65 per cent iron and running down to an average of 0.30 phosphorus. The mine will be stripped and a shaft sunk for milling. It is figured that the stripping ought not to cost 10c. a ton for the ore it will uncover and that milling should be done for 20c. more. These are not exceptional figures. The mine will not ship this year.

Monroe.—This 120 acres in the E. ½ of Section 28, T. 58, R. 20, is to be opened at once, and bids for stripping have been called for. It contains above 10,000,000 tons of excellent ore and will be an easy proposition, though possibly rather wet. This is the fifth mine in this square mile and there are more to come.

Stephens.—The 1903 output will be about 200,000 tons. This mine is not to be confused with the Stephenson.

MONTANA.

BEAVERHEAD COUNTY.

Indian Queen.—It is reported that negotiations are under way for the sale of this mine, on Birch Creek, to a New York company. The matte smelter is being remodeled. A large body of copper glance ore is reported exposed.

BROADWATER COUNTY.

Stray Horse.—This mine, about 7 miles from Winston, has been leased and bonded by F. W. Rossburg and Charles R. Sutton, of Helena, from the Ajax Mining Company. The property is developed by three tunnels, and the ore carries gold, silver and lead. A 40-ton concentrator is to be built.

CARBON COUNTY.

Rocky Fork Coal Company.—The property of this company at Red Lodge is to be absorbed by the Nothwestern Improvement Company, of Tacoma, Wash. The absorption is the result of a general reorganization of the Northwestern Improvement Company, which owns and operates all Northern Pacific coal properties. It is said that a spur from the Northern Pacific will be built from Red Lodge to the Bear Creek coal fields.

FLATHEAD COUNTY.

Illinois & Montana Mining Company.—Work is to be resumed on this company's property in the West Fisher District. J. H. Greiger is manager.

GALLATIN COUNTY.

Bozeman Corundum Company.—The shaft on this company's property near Bozeman, is down 100 ft. A 4-ft. vein has been cut.

GRANITE COUNTY.

About 12 men are employed testing placer ground in Henderson Gulch for a Minneapolis company under C. E. Van Barneveld.

Granite Bi-Metallic.—The bullion stolen from this company's mill recently has been recovered. Important clews were obtained, and an arrest has been made.

LEWIS & CLARKE COUNTY.

Big Indian.—A rich strike is reported having been made recently at this property, 4½ miles south of Helena. The 60-stamp mill is running 12 hours daily. The mill is operated by electricity. The plate area has been doubled.

Capitol Mining Company.—This company recently made a rich strike in the Faith, Hope and Charity group, near Helena.

Mission Peak Mining Company.—A cyanide annex is to be added to this company's stamp mill. The mill has been running for two years.

MADISON COUNTY.

Elkhorn-Iola.—A new gasoline hoist has been installed at this mine, near Pony, and day and night shifts are employed on development. Charles L. Finch is superintendent.

Keursarge.—A 3-compartment shaft is to be sunk on this mine, near Virginia City, to a depth of 500 ft.

Montana & St. Paul Mining Company.—This company is getting ready to work its property on Wisconsin Creek.

Mountain View.—A strike of copper, silver and gold ore is reported at this property, in Bear Gulch, 8 miles northeast of Twin Bridges. The strike was made in the breast of the tunnel, now in 2,000 ft., and at a vertical depth of about 800 ft., and carries good values in copper, gold and silver. The owners are the Johnston Brothers, of Butte.

Watseka.—Two mills are now running at this mine, in the Rochester District. The new mill of 150 tons daily capacity cost about $65,000. About $1,400 worth of concentrates are being shipped daily to Butte. The mine is 600 ft. deep and developed by levels run at each 100 ft. The company employs 150 men.

PARK COUNTY.

Kimberly-Montana Gold Mining Company.—Forty stamps at this company's Revenue Mill, at Jardine, are dropping continuously. The talings are treated by cyanide. The new 40-stamp mill, near the cyanide plant, will soon be completed. Frank Gilmartin has charge.

Scotch Bonnet Mining Company.—A smelter is to be erected on this company's property, on Scotch Bonnet Mountain, to be completed about November 1.

SILVEB BOW COUNTY.

Anaconda Copper Company.—Work on the new flues of the Washoe Smelter is progressing rapidly. At present about 1,200 men are employed, 700 of whom are on construction work on the flues. A large number of improvements are being made throughout the works, particularly in the concentrator.

Minnie Healey.—The Supreme Court has remanded for a new trial this case which was decided in favor of F. A. Heinze and against the Boston & Montana Company. The Supreme Court bases its findings on what it terms the "evident misconduct" of Judge Harvey on account of which the appellant, the Boston & Montana Company did not get a fair trial. The findings say little on the underlying merits of the action itself.

Nipper Consolidated Copper Company.—The Supreme Court recently modified the order granted by Judge Clancy, allowing the plaintiffs in the suit of this company against the Parrot Silver and Copper Mining Company to enter the workings of the defendant for the purpose of making examination of the alleged extralateral rights of the Nipper lode.

NEVADA.

HUMBOLDT COUNTY.

California-Nevada.—It is reported that the managers of this company have closed down the small mill at Unionville and left, among other things, a number of creditors. It is said that all the company's property in the county which could be levied on was tied up.

NYE COUNTY.

(*From Our Special Correspondent.*)

Prof. J. E. Spurr has completed his examination of Tonopah; he left this week for Silver Peak, 37 miles to the southwest, where he will probably be detained 2 months. As Mr. Spurr's detailed report on the Tonopah District with maps, will not be ready for some months, he is endeavoring to arrange for the publication of an advance bulletin. The water problem which threatened at one time to be a serious drawback, appears to have solved itself. At the Halifax mine 2,000 ft east of the Tonopah Mining Company's ground operations have been temporarily suspended owing to an influx of water, estimated at 35,000 gal. per day. South of the Halifax, the Rescue mine has 30,000 gals. per day and the Gold Hill mine 1,000 ft. south of the Rescue, has 500 gals. per day. On the west and northwest of the Tonopah Mine, the Silver Top, Tonopah Belle and Golden Anchor each have about 6,000 gals. per day. It is remarkable that at a depth the Tonopah mine, deepest of all, has no water and also that deep shafts south and west of the Gulch in which the town is built, have not encountered any.

Local capitalists are about to open some seams of lignite about 32 miles west of Tonopah.

PENNSYLVANIA.

BITUMINOUS COAL.

Jones & Laughlin Steel Company.—This company will build 500 coke ovens at Pittsburg in the downtown mill district, about two miles from the City Hall, to supply a new blast furnace. The company is at present operating 1,300 ovens. The new ovens added to the plant will be provided with smoke and vapor consuming appliances.

National Coal and Coke Company.—This company is being organized. The capital stock is $5,000,000 and $2,500,000 in bonds, $2,000,000 of which has been underwritten. Two large tracts of coal land, aggregating about 10,000 acres, will be developed at once and 800 coke ovens built in the Klondike section.

United States Steel Corporation.—Engineers of this company are making surveys preliminary to developing 1,600 acres of coal land near Brownsville, acquired by the absorption of the Union Steel Company. Two shafts and a slope are to be put in and a crushing plant installed.

TENNESSEE.

POLK COUNTY.

Tennessee Copper Company.—This company is receiving a large amount of additional machinery for its new copper smelter, consisting of a compound Corliss blowing engine, two 500-h. p. boilers, a lighting dynamo and a blast furnace, 56 by 180 in. The company employs several hundred men. Mr. Haywood is superintendent at Ducktown.

UTAH.

(*From Our Special Correspondent.*)

It is reported that a railroad to a vast undeveloped mining region west of Salt Lake is a certainty and that $800,000 of the money has been subscribed, enough to build the line nearly 60 miles; as owing to the easy grades it is thought the road will cost not to exceed $15,000 per mile. The promoter is J. A. Jacobs, manager of the Salt Lake & Mercur Railway, who has been at work on the project for several months past. He has enlisted the support of a number of Utah mining men, some of whom are interested in the district; also David Eccles and Thomas D. Dee, of Ogden. The line is surveyed from a junction point with the San Pedro, Los Angeles & Salt Lake Railway, near Eureka, in the Tintic District, westward through Dugway and Fish Springs to a point near the Nevada state line. Mr. Jacobs is endeavoring to acquire a lease of the branch of the San Pedro, Los Angeles & Salt Lake line between Lehi Junction and Tintic, also to make arrangements for the transportation of ores from Tintic to Salt Lake.

Ore and Bullion Settlements.—Salt Lake banks reported settlements for the week ending July 24 of $285,818, as follows: Crude ores and concentrates, $139,618; base bullion, $142,500; gold bars, $3,700.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Consolidated Jefferson.—The new shaft at this property is down 90 ft., and is to be sunk to 100 ft.

Majestic Copper Company.—President W. B. Mucklow announces that the lead furnaces at Milford, will blow in some time in August. They will be supplied with ore from the Harrington & Hickory Mine. The copper furnaces will not get started until later.

Newhouse Mines and Smelters.—This company has contracted with a Chicago firm for about 10 miles of 14-in. pipe for conveying water from Wah Wah springs to the town and smelter site at Newhouse, near the Cactus Mine. Delivery is to be made by October 1.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Ore Shipments.—For the week ending July 25 shipments amounted to 136 cars: Ajax, 3; Bullion-Beck, 8; Black Jack, 13; Carisa, 2; Centennial-Eureka, 29; Eagle & Blue Bell, 1; Dragon Iron, 24; Grand Central, 19; Gemini, 6; Joe Bowers, 1; Lower Mammoth, 2; LaClede, 1; Mammoth, 2; Star Consolidated, 3; South Swansea, 1; Uncle Sam Consolidated, 1; Victor Consolidated, 6; Noon's Iron Mine, 4; Yankee Consolidated, 10.

Lower Mammoth.—Connection has been made with the main ore body on the 1,200 level at 160 ft. from the shaft. Shipments will not increase.

South Swansea.—Two cars of ore from this property were marketed this week; the first since the closing of the mine several years ago. The ore is from the 850 level.

Uncle Sam Consolidated.—At a recent meeting of the directors it was decided to proceed with the construction of a 50-ton concentrator. A contract for water has been signed with the Bullion-Beck & Champion Company.

Yankee Consolidated.—Good headway is being made in sinking a winze from the tunnel level. The new air compressor is working satisfactorily.

IRON COUNTY.

(*From Our Special Correspondent.*)

Johnny.—An order has been placed by Manager W. J. Dooly, of Salt Lake, for 10 more stamps.

Rice Group.—The litigation has been settled through a compromise, J. J. Knight and C. O. Newell, of Provo, Utah, waiving their claim for $10,000 damages and securing a lease and bond on the property. They will proceed with development.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—Copper bullion shipments for the week ending July 24 were 3 cars, 184,500 lbs.

Boston Consolidated.—An important strike is reported in this Bingham property. The work tunnel some time ago penetrated a body of low grade ore fully 150 ft. wide. In cross-cutting this vein, a rich streak, about 6 ft. wide was found, which Managing Director Newhouse states will average anywhere from 20 to 50 per cent copper, while the balance of the great vein will go about 3 per cent.

Jay Gould.—This Bingham group has been purchased by Col. E. A. Wall, and is to be consolidated with the Maxwell property, lying just east of the Yampa Mine.

Tintic Company.—Jones & Jacobs, of Salt Lake, have been awarded the contract for the construction of the Yampa smelter building at Bingham.

United States Smelter.—Shipments of copper bullion for the week ending July 24 were 3 cars, 183,579 lbs.

Utah Consolidated.—Official announcement is made that ground will be broken for additional smelter buildings early in August. The changes in the dust flue chambers are completed and the plant is treating an average of 520 tons of ore daily. Shipments of copper bullion for week ending July 24 were 4 cars, 241,500 lbs.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Comstock.—Manager George R. Hancock announces that sinking from the 300-level will begin August 1. The matter of consolidating the property with the California, adjoining, is under discussion.

Daly-Judge Mill.—Superintendent F. W. Sherman states that by his slimes settling tanks he is effecting a close saving, having cut the lead losses in the tailings down to one-half of one per cent and the zinc to less than 2 per cent. The plant is handling an average of 225 tons of ore per day. After repairs to tracks are made the tonnage will be 300 tons.

Daly-West.—This mine is shipping an average of 120 tons of crude ores daily and milling 300 tons.

Minola.—The hoist building was destroyed on July 24 by the explosion of a boiler. The plant will be rebuilt. A. H. Mayne, of Salt Lake, is manager.

St. Louis-Ontario.—A new hoist has been ordered from the Salt Lake Hardware Company and will be installed.

WASHINGTON COUNTY.

(*From Our Special Correspondent.*)

Utah & Eastern Copper Company.—The smelter is handling 50 tons of ore daily.

Gold Hill Mining Company.—This company has bonded its property up James Gulch for one year to John S. Bedier for the reported sum of $50,000. The property is developed by a 100-ft. shaft and a 500-ft. tunnel.

VIRGINIA.

RUSSELL COUNTY.

It is reported that B. J. Wyser has sold 50,000 acres of Russell County coal land to Messrs. Hall and Alexander, of Indiana, for $50 per acre.

WASHINGTON.

FERRY COUNTY.

Republic Ore Shipments.—Ore shipments for the week ending July 18 were: Zala M., 3 cars; Trade Dollar, 2 cars; Lone Pine, 7 cars; Morning Glory, 5 cars; Quilp, 14 cars; total, 31 cars.

(*From Our Special Correspondent.*)

Lone Pine.—For the week ending July 18, 175 tons of ore were shipped to the smelters. The company employs 21 men. No exploration work is being done, owing to the lack of machinery.

Lucille Dreyfus.—After several weeks' idleness work has been resumed. About 150 tons of ore are going from the dump to the smelter.

Mineral Hill Consolidated.—Work was recently resumed after several months' idleness.

Morning Glory.—The shaft is down 70 ft. below the No. 2 sub adit level. In the week ending July 18, 5 carloads of ore were shipped by railway to the Tacoma Smelter.

Mountain Lion Gold Mining Company.—A basis of settlement of the taxes due Ferry County has been agreed on. It is reported that the control of the company has passed into the hands of a Canadian syndicate. J. S. Wyatt, formerly manager of the Mountain Lion Mine and mill, is expected at Republic daily to turn over the company's property to the new management.

Quilp.—For the week ending July 18, 14 carloads of ore were shipped to the Tacoma Smelter.

White Elephant and Shamrock.—The vein is over 100 ft. wide. A shaft is down 27 ft., showing ore assaying from $4.80 to $15 in gold and copper.

Zala M.—Three carloads of rich silver-bearing ore were shipped to the Granby Smelter, July 17.

FOREIGN MINING NEWS.

AUSTRALIA.

WESTERN AUSTRALIA.

The reported gold production in June was 208,059 oz. bullion. For the six months ending June 30 the total was 1,221,759 oz. bullion, against 1,035,729 oz. in the first half of last year, showing an increase of 186,030 oz., or 18 per cent. The total bullion this year was equal to 1,033,921 oz. fine gold, or $21,371,154.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

The third furnace has been received at the Boundary Falls Smelter and the third blower and direct-connected engines are being installed.

Boundary Ore Shipments.—The shipments for the week ending July 18 were as follows: Granby Mines to Granby Smelter, 7,344 tons; Snowshoe Mine to Sunset Smelter, 1,950; Mother Lode to Greenwood Smelter, 3,131; Sunset to Sunset Smelter, 1,150; B. C. Mine to Greenwood and Sunset smelters, 810; Emma to Granby Smelter, 240; Oro Denoro to Sunset Smelter, 270; Athelstan to Sunset Smelter, 175; total for the week, 15,050 tons; for the year to date, 301,332 tons.

British Columbia Copper Company.—This company is preparing to erect a brick smokestack 120 ft. high at its smelter, and has let a contract to Frank Coryell, of Grand Forks, for 4,000,000 brick. Smelting operations will not be interfered with.

Granby.—This smelter treated 8,343 tons of ore during the week ending July 18, making a total for the year of 168,405 tons.

Morrison.—This mine is shipping regularly to the British Columbia Copper Company's smelter, at Greenwood. The ore is taken from the dump.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—The ore shipments for the week ending July 18 were: Le Roi, 3,210 tons; Centre Star, 1,590; War Eagle, 1,020; Kootenay, 275; Le Roi No. 2, 780; Velvet, 125; Giant, 40; Jumbo, 125. Total for the week, 7,165 tons, and for the year to date, 200,093 tons.

Le Roi.—This Rossland mine is shipping from its No. 1 dump about 150 tons daily to the Northport smelter.

Velvet.—This mine at Rossland has suspended work indefinitely. The low grade ore exposed will not yield a profit at present cost of transportation to the railroad.

MINING STOCKS.

(Full quotations are given on pages 183 and 184.)

New York July 29.

The active speculation on the general stock exchange and the interest centered in the rapid fall of prices continues to divert attention to a considerable degree from mining stocks. In the industrial field United States Steel has received the most attention. After falling to the lowest point on record the common stock of the United States Steel Corporation sold on July 28 at $24, closing price, and the preferred at $72¼. Other industries suffered in an almost corresponding degree. One of the steadiest on the list was American Smelting & Refining, in which dealings were comparatively small. After falling to $41, the common stock is now selling at $42½, and the preferred at $90¼.

Amalgamated Copper fell several points below $40; out on July 28 recovered part of its loss, selling at the close at $41¾. Anaconda sold down to 70, but recovered to 73 per cent. In the outside coppers, dealings have been comparatively light, but prices were not by any means strong. Greene Consolidated, of Mexico, sold down to $18½; Tennessee Copper was pretty steady at $25; United Copper sold at $16½@17; White Knob at $9@10, and British Columbia at $3½.

Tonopah Mining showed some sales, closing at $5¾ bid and $6¾ asked.

On the Consolidated Exchange Standard Consolidated came out for the first time in some weeks, selling at $2.65; Small Hopes showed a sale of 300 shares at 30c.; while Gold Dollar reported 100 shares at 4½c. In the Comstock shares very little was done. Mexican sold at $1; Sierra Nevada, 54@55c.; Hale & Norcross, 53c. Stocks generally were heavy, and it looks as if it would take some time to recover from the low range of values which has been established.

Boston. July 28.

(From Our Special Correspondent.)

The continued liquidation of stocks in New York brought utter demoralization to this market and Friday's low prices in the Metropolis caused many low records to be made in the prices of many Boston copper shares. Up to this time, however, the recovery has been sharp and closing prices are not far under a week back. One or two stocks actually show better prices than a week ago. Since the first of the year many prices have been cut in half and they were thought to be cheap then.

Copper Range Consolidated followed Amalgamated pretty close during the decline, but did not get within $1 of the latter's price. It did touch $37 per share, which in one-half the price it sold at February 13, namely $75. The recovery to $43.50 was sharp. A feature was the sale of 3,000 shares Monday in one block at $41. It is said that control of Copper Range is safely locked up in a tin box, although it is likely that considerable stock is held by the Amalgamated and allied interests at this time.

It is figured that 20 of the more active copper stocks have declined close to $250,000,000 since the high prices of last February. In Friday's slump the high-priced issues had their share, Quincy, Tamarack, Tri-Mountain and Calumet & Hecla, all recording low prices. Quincy touched $87.50, ex-dividend of $3. Tamarack touched $75, although it rallied quickly and touched $90, Monday. Tri-Mountain fell to $80, recovering to $82, and Calumet fell to $400, subsequently selling at $430, and closing at $415. The Calumet's annual report was favorably commented on. Osceola broke $6.50 to $43.50, but rallied to $53, and closed $1.50 above a week ago at $51.50. Mohawk fell $5.50 to $31, but recovered to $35.75. Parrot touched $16, but closes 50c. above a week ago at $18.50.

Utah Consolidated went off with the rest of the list to $22, but recovered to $25, which is a net gain of 50c. for the week. Wolverine tumbled $8.75 to $54, but recovered to $61 again. Dealings in the latter were light and the market is very narrow. Centennial broke $4 to $12, but has since touched $15.50. United States went off $2.75 to $16.25, but recovered $2 of the decline. Old Dominion sold off $2 to $9, closing at $10.

At least six stocks have made low-price records; namely Arcadian, $1.50; Isle Royale, $5.50; Trinity, $4.25; Victoria, $3, and Dominion Iron & Steel, $11. Atlantic touched $8.50, but recovered $1, and Bingham fell to $20.25, rallying to $23. Franklin touched $6.75, with $1.25 recovery; Michigan, $6.62½, recovering to $7.50. Dominion Coal broke to $88, but recovered to $96. United States Coal & Oil touched $9.62½, rallying to $11.

Colorado Springs. July 24.

(From Our Special Correspondent.)

The week closes with an ominous strike situation. This storm has been threatening for some time, but so far nothing of a serious nature has materialized, although it must be admitted that there are more tangible grounds for apprehension this week than at any period since the trouble between the unions and the Denver smelters broke out, several weeks back.

As it is, a good week was seen among stocks. Elkton opened selling at 41c., advancing to 42c., but closed the week at 41@40½c. El Paso sold at 57c. for several days at the beginning of the week, but lost under heavy selling a day or two ago, closing with only 56c. bid. Gold Dollar Consolidated was inactive and sold at 4¾c. Golden Cycle sold on the opening of the week at 69c., but dropped to 65¾c. and 66c. in view of the 3c. dividend declared, in which the stock purchased after the 20th did not participate, owing to the closing of the books on that date. During the week these shares were transferred from the regular mines list to the newly created unlisted department, owing to the fact that the company has refused to register the stock, as required by the rules of the Exchange. The refusal of the company to comply with the well-known provisions and safeguards of the Exchange was an outgrowth of the fight between the majority and minority and was a retaliatory measure of the former against the latter.

Salt Lake City. July 23.

(From Our Special Correspondent.)

As Friday of this week was a legal holiday in this State, sessions of the Stock Exchange were held during the first four days. The total sales of Utah and other stocks were 106,119 shares, which brought $30,624.

A call was had for Ajax, which was sold at 23@24c. Butler-Liberal, the Bingham company formed as a result of the Ben Butler and Chicago-Bingham deal was bought at 14c. Century was started off at 41c., but declined. Consolidated Mercur participated liberally in the sales, closing higher. Daly-Judge, Daly-West and New York Bonanza, all Park City stocks, ended the week lower. Improved conditions reported from the Silver Shield, of Bingham, created a demand for that stock at advanced prices, 9,100 shares being transferred. Little Bell, another Park City stock was in demand, but only a limited amount was furnished, the stock being quite closely held. It sold at $2.46@$2.50. Tintic stocks again lead in the volume of sales made. Lower Mammoth transferred to the extent of 13,900 shares; starting at 78c., it raised to 95c., but came down to 89c. again, stiffening, however, at the close to 91c.

The Grand Central Company distributed a dividend of $25,000, while the Sacramento directors posted the regular July dividend of $5,000.

COAL TRADE REVIEW.

New York. July 30.

ANTHRACITE

There has been no material change in the anthracite coal trade during the past week. Demand is loosing its urgency as consumers and dealers get supplies ahead, but is still so widely distributed that it calls for all the tonnage the mines produce. Premiums for prompt delivery, however, are a thing of the past, and it is likely that the principal producers will be able to begin storing coal within a month.

There is considerable speculation as to what interests are now predominant in the mining and transportation of anthracite and as to the probable course these interests will pursue during the next few years. Current rumors, which may be founded on fact, that the Lehigh Valley Railroad is to come under the control of the Goulds indicate that Pennsylvania Railroad and Gould interests have arranged some compromise. It is said that this compromise involves the resignation of a prominent official of the Pennsylvania Railroad. However, the present distribution of Reading stock shows pretty plainly that the house of J. P. Morgan & Co. is no longer the factor that it was in anthracite circles and that the Pennsylvania Railroad has now the place of power, second place being probably held by the Vanderbilts. It is even said that the house of J. P. Morgan & Co. holds no Reading stock.

In Lake Superior territory arrivals have been heavy and docks are in a congested condition, though demand from interior points is good. In Chicago territory buying is still active, largely because the small country dealers are taking their turn at laying in supplies. Along the lower lakes and in the all-rail trade farther East, though demand is much less urgent than it was, a considerable tonnage is being taken. At seaboard points, in spite of the heavy movement thus far, there are many dealers who have not yet sufficient supplies, and demand particularly from the shoal-water ports continues strong. At New York the small steam sizes are in plentiful supply, as is usual at this season, and a dull bituminous market affects the demand. Prices, however, are about $3 for pea and $2.50 for No. 1 buckwheat, though certain classes of washery coal can be had for less.

BITUMINOUS.

In the Atlantic seaboard bituminous trade there is more demand, and the market has a better tone, probably because of car supply for the past week or ten days. The lower grades of coal are offered at about the same price as last week; that is, $2.60@$2.80, f. o. b. New York harbor shipping port. A continuation of short car supply would probably send prices up. Producers of the better grades are, on account of car-supply, having some trouble in supplying their customers just now with requirements for current consumption, but during the last two days car-supply has improved, though the railroads are not giving satisfaction in their replies to inquiring shippers. Some producers who have contracts to certain shoal-water ports calling for regular deliveries through the summer are getting worried at their inability to ship on account of the car-supply.

Trade in the far East is calling for a fair tonnage, and is urging shipments on orders now in hand; producers, however, are bothered by car-supply. Along Long Island Sound trade is quiet, and shippers find it hard work to get orders from that territory. At New York Harbor points the market has a better tone, though little more coal is being taken than during the last three months. The all-rail trade maintains the same position as for several weeks past, consumers taking about 75 per cent of their contracts.

Transportation from the mines to tidewater is good, coal coming through in less than a week. Judged by appearances the railroads are trying to improve conditions and evade blockades by quick transportation. They have sent circulars to shippers asking for cooperation by unloading coal promptly when it arrives at tide. Car-supply, which has been around 25 per cent of the demand, within the last few days has improved to 50 or 60 per cent. In the coastwise vessel market vessels are in fair supply, and rates show signs of weakness. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, 90@95c.; Portsmouth and Bath, 95c.; Lynn and Bangor, $1.10; Newburyport, $1.15; Saco, $1.15@$1.20, and towages; Gardiner, $1.05@$1.10, and towages; Providence, New Bedford and Long Island Sound, 80c. From New York Harbor rates are $1@$1.10 to Boston, Salem and Portland, and 75c. to Sound points.

Birmingham. July 27.

(From Our Special Correspondent.)

There are prospects that the United Mine Workers of America in this district, who suspended work on July 1, pending the making of a new wage contract, will return to work in the next few days. After considerable discussion with the operators an agreement was arrived at that the differences between the two sides should be submitted to a board of arbitration, to consist of two men to a side, these four to select a fifth member, or umpire. The coal miners demanded from the start an advance in their maximum and minimum wage scale of 5c. per ton, semi-monthly pay days and eight hours to constitute a day. The operators offered an advance of 2½c. on the ton in the maximum wage scale. When the arbitration plan was finally adopted the operators selected Charles McCrery, vice-president of the Tennessee Coal, Iron and Railroad Company, and R. H. Pearson, of the Central Coal Company. The miners selected W. R. Fairley, Alabama member of the National Executive Board, and T. L. Lewis, the national vice-president of the United Mine Workers. These four men (President Ed. Flynn, of the district organization of the miners acting for Mr. Lewis) selected Judge George Gray, of Delaware, as the fifth member of the board, or the umpire. It was stipulated that as soon as Judge Gray accepts the position the miners will resume work, and it is believed that this will be done. The arbitration board will sit some time next month. There are more than 13,000 members of the United Workers of America idle. As has been stated before, about 3,000 other men have been thrown out of employment for the time being on account of the shortage of coal.

Deeds passed during the past week from the Louisville & Nashville Railroad to the Pratt Coal Company for coal lands in the western part of Jefferson County, which represented a cash transaction of $55,000. The property will be developed by the Pratt Company. The Louisville & Nashville Railroad Company is now constructing a line to reach the property and the same will be completed in a few weeks.

Certificate of incorporation of the Pennsylvania Coal Company has been filed with the Secretary of State in Montgomery, the place of business being designated as Birmingham. The capital stock is placed at $150,000, and the subscribers are S. Boyer, F. J. Boyer, C. A. Conrad, J. F. March and W. S. Yocum, of Reading, Pa.

The Sloss-Sheffield Steel and Iron Company, the second largest coal producing company in the South.

withdrew from the Alabama Coal Operators' Association during the past week, and will deal with its coal miners separately. However, the company has consented to make the same contract with its miners as will be made by the other companies after the arbiration board has made its award.

Chicago. July 27.

(*From Our Special Correspondent.*)

There is little change in the anthracite market, which continues heavy, for both city and country, with a large supply pouring in constantly by lake. As is usual for the season of the year, the all-rail imports of anthracite amount to comparatively very little. With the end of the month at hand, there is, of course, the added stimulus to buying of the fact that a 10c. advance will be made August 1, but to all appearances the heavy buying will continue well into August. Egg is still in most active demand, though in better supply than a month ago. Large stocks of anthracite are being laid in as much as possible for the winter. Dealers report little complaint from the advanced price for anthracite this year, over the normal for former years; the general opinion seems to be that last winter's famine proved the value of anthracite to the public, and the public should be willing to bear a small increase in the cost.

The bituminous market is quiet. Smokeless is in a little better demand than last week, the nominal price has advanced to $3.90 for Pocahontas, New River and Maryland, though sales are said to have been made at 10c. to 30c. under this figure. Hocking is the most popular of bituminous grades; it is quoted at $3.25, though the price fluctuates considerably due to variable demand and supply, chiefly the latter. Illinois and Indiana are getting into healthier tone; supply is being better regulated to consumption and there is less bunching of shipments into demurrage coal that must be got rid of at any price; Illinois and Indiana block brings $2.70@$2.90, and run-of-mine $2.10@$2.20. Youghiogheny is in somewhat slighter demand, at $3.25 $3.40.

Cleveland. July 28.

The coal trade in this territory has been firm and prices have been steady. The domestic demand for coal has eased off a little, and the laying in of winter's supply has not been indulged in to the extent desired by the dealers. The summer stocks are very heavy. The supply to factories has been good, and in no instance has there been the slightest difficulty. The railroad situation is about all that could be desired, the supply of cars being adequate to all demands made upon the railroads. The coke supply in the Valleys has been sufficient to prevent any further banking of furnaces and it is beginning now to look as if, despite the heavy increase in consumption, the ovens would be able to meet the demands upon them. The situation is good all through and the market easy.

On the lakes the coal trade has been moving without the slightest difficulty. The railroads have been sending a fair amount to the lakes and there has not been the slightest difficulty about getting boats for any possible emergency. The only delay seems to be in getting the coal away from the upper lake docks, where the railroads have beeu unable to take care of all that came. This situation is, however, being eased up materially and the market is becoming stronger. The whole range of the trade is satisfactory. The rates of carriage remain unchanged at 50c. to Lake Michigan and 40c. to Lake Superior.

Pittsburg. July 28.

(*From Our Special Correspondent.*)

Coal.—There is nothing new in the railroad coal situation, the regular season prices being well maintained. There have been no shipments of river coal, as the water in the Ohio has been too low. The river mines have had an excellent opportunity during the spring and early summer to get all their accumulations cleaned out, and have had plenty of empties returned from down river points, so that they are now running full and loading coal for the next rise.

Connellsville Coke.—Standard Connellsville coke remains very firm at $3 quoted for furnace and about 50c. more for foundry. Outside coke is rather weak, there being less demand than for the standard article, and various outside grades can be had down to about $2 for furnace and $2.25 for foundry. The *Courier* in its last weekly report gives the production for the previous week at 252,819 tons. The shipments were 12,040 cars, distributed as follows: To Pittsburg and river tipples, 4,670 cars; points west of Pittsburg, 5,663 cars; points east of Connellsville, 1,707 cars, showing a gain of 1,310 cars.

San Francisco. July 25.

(*From Our Special Correspondent.*)

The coal market continues steady, with little better arrivals. Prices are unchanged, notwithstanding the recent advance in quotations for fuel oil. The latter, however, encourages coal dealers here to believe that prices will remain firm.

Yard prices for Pacific Coast coal to dealers in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle, $6.50; Bryant, $6.50; Coos Bay, $4.50. Rocky Mountain coals in large lots, ex-car, are quoted at $14 for Colorado anthracite and $8.50 for Utah and Wyoming coals. Eastern coal is scarce, but quotations remain nominally at $14 for Pennsylvania anthracite and $13 for Cumberland in cargo lots. Foreign coal sells in large lots as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo and Wallsend, $7.50.

Foreign Coal Trade. July 30.

Export trade continues very quiet. There is nothing doing, except to the West Indies. Imports have also fallen off, and very little foreign coal is now coming to Eastern ports.

Messrs. Hull, Blyth & Co., of Cardiff and London, report, under date of July 18, that prices for best Cardiffs are still advancing and most descriptions are very scarce. Newports stronger in sympathy. Quotations are: Best Welsh steam coal, $3.96; seconds, $3.72; thirds, $3.60; dry coals, $3.36; best Monmouthshire, $3.42; seconds, $3.24; best small steam coal, $2.16; seconds, $1.98; other sorts, $1.86.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The freight market is still inactive and not much business doing. Some rates quoted from Cardiff are: Marseilles, $1.40; Genoa, $1.32; Naples, $1.32; Singapore, $2.40; Las Palmas, $1.30; St. Vincent, $1.62; Rio Janeiro, $2.22; Santos, $2.70; Buenos Aires, $1.98.

IRON TRADE REVIEW.

New York. July 29.

The market continues to be a waiting one, in spite of all assertions to the contrary, on the part of those who are interested in maintaining the prices. New business continues scarce, and such concessions as have already been made do not seem to bring forward buyers to any considerable extent. It looks very much as though purchasers had made up their minds that still lower prices were to be secured by waiting, and, at any rate, they propose to try.

Sales of foundry iron have been a trifle better, but the new business is mainly in small lots for immediate delivery. The same may be said of some business which has been done in plates and structural material. The other branches of trade remain quiet, so far as new business is concerned.

In the South it is stated that the last cut of $1.50 in pig iron price made by the Association furnaces has brought only small orders, and iron is beginning to accumulate in the furnace yards. The Alabama furnaces will probably not be interrupted at all by the coal strike, as an agreement has been made to arbitrate the differences.

The leading makers of steel billets in the United States have revived the association which existed some years since, the number of parties to the agreement having been much decreased as the result of consolidations. The members now are the United States Steel Corporation, Jones & Laughlin Steel Company, Wheeling Steel & Iron Company, Cambria Steel Company, Pennsylvania Steel Company, Lackawanna Steel Company, and Maryland Steel Company. Meetings are held at New York, at which inquiries and sales are regularly reported. The agreement refers exclusively to prices, which have been established for the principal points of consumption. The standard is the Bessemer 4 x 4-in. billet and bloom. The established price for billets of the class named for the present is $27 at mill, Pittsburg, Wheeling, Shenango and Mahoning Valleys. At other points, rates will depend upon freight charges. For Philadelphia and Baltimore the price is to be $28.25; for New York, $28.75, and for Cleveland, $27.50. Open-hearth billets and blooms will be charged $1 above the established price; $1 will also be added for billets less than 4 x 4; $1 for slabs, and $1 above standard billet price for sheet bars or tinplate bars.

Birmingham. July 27.

The Alabama pig iron market continues quiet, much to the chagrin of the furnacemen, who had hopes that there would be a substantial improvement in the market conditions following the cut in prices made. Rumors prevailed a few days since that some of the larger consumers in the South were in the market and were buying supplies in good quantity, but there was no verification, and the railroad officials announce no extra movement of iron. As far as can be learned, non-association furnaces in this section are not now underselling the association furnaces much, if any at all; so that the statement can be made that consumers are still at their waiting game, and are looking for even cheaper iron. None of the furnacemen will say that there are indications of another reduction, though some talk has been heard on the outside that another reduction of from $1 to $1.50 per ton would be a stimulation to the market.

Furnace yards are beginning to show heavy stocks. No less than 110,000 tons of pig iron are said to be stocked in this district, and more of it is still going to the yards. This, however, does not cause any apprehension. There is no change in production in this district. Furnaces have good stocks of coal and coke on hand. The two furnaces blown out for repairs cut down the production some, but two furnaces, one at Bessemer and one at Anniston, started up and more than made good the difference. It is announced that as soon as the miners are at work again steadily and coke can be manufactured in quantity enough to warrant it, two new furnaces will be started up in this State, one at Gadsden, belonging to the Alabama Consolidated Coal and Iron Company, and the other at Holton, in Tuskaloosa County.

The report of the Southern Iron Committee for the year ending June 30 shows that there were shipped from the Southern district 96,374 tons of steel billets and 4,815 tons of steel rails, a total of 101,189 tons of steel. The cast-iron pipe shipments amounted to 166,795 tons, while the pig-iron shipments aggregated 1,735,965 tons. The total shipments of all products amounted to 2,003,949 tons. By districts, the following shipments were made for the year: Anniston, 331,337 tons; Birmingham, 1,000,487; Chattanooga, 311,901; Middlesboro, 68,159; Nashville, 120,715; Sheffield, 171,350 tons. The total shipments for the year ending June 30, 1902, amounted to 1,843,343 tons.

The following quotations are given: No. 1 foundry, $14; No. 2 foundry, $13.50; No. 3 foundry, $13; No. 4 foundry, $12.50; gray forge, $12@$12.50; No. 1 soft, $14; No. 2 soft, $13.50.

The rolling mills in this section are still quiet. The suspension of work on the part of the coal miners is one reason for this idleness, while a slow demand for the product of the mills is probably the greater reason. While the mills are idle many improvements are being made. In the Birmingham rolling mills additional boilers are being placed in the forge department, while the new 12-in. mill is being put in rapidly. At the Bessemer and Gate City mills improvements are about completed. R. H. Pritchard has assumed the superintendency of the Gate City mills, vice T. W. Walker, resigned on account of his health. At a meeting between President T. J. Shaffer and other officials of the Amalgamated Association of Iron, Steel and Tin Workers and representatives of the Birmingham and Bessemer rolling mills, held in Birmingham last week, a wage scale for the plate-mill departments of the two mills named was discussed. No conclusions were arrived at. The plate-mills will not start up until the new scale is signed. It is understood that the men will accept the old scale of wages.

Chicago. July 27.

(*From Our Special Correspondent.*)

The pig iron market continues unchanged, or but slightly changed, the only difference noted from last week by agents, being an increase in the number of small orders and a decrease in the average size of the orders. Nominally the price of No. 2 Southern or Northern is $13@$13.50 at furnace; sellers are said to be glad to get $11@$12 for what they sell. Everybody is looking for the bottom of the market, but no bottom seems to be in sight, and speculation is useless in such a condition. Sales are of the quick-delivery type; the foundryman does not buy until the last moment and then he wants delivery the next day.

Coke is abundant and $4.50@$5 on spot sales, and $6 on contracts, of which very few are being made.

Cleveland. July 28.

(*From Our Special Correspondent.*)

Iron Ore.—The lake market is without change and is dull. The delays to the boats continue to be about three days, but without hindering the movement of ore down the lakes, since the vessel capacity is much in excess of needs. The rates of carriage hold at 80c. from Duluth; 70c. from Marquette and 60c. from Escanaba. No ore sales have been made and none are expected until after the business situation is cleared up. Ore prices remain at $4.50 for bessemer old-range and $4 for bessemer Mesabi.

Pig Iron.—The call for foundry iron is in car-load or 100-ton lots. Nothing has been done for the fourth quarter as yet and it is hardly expected that anything will develop for some time. The price has dropped to $17.50 in the Valleys for No. 2. Southern independent furnaces are quoting $13, Birmingham,

with Southern association stacks adhering to $13.50. Nothing is being done on contract material in either quarter. The buying is steady, however, and almost the entire production of the stacks is being consumed. Gray forge is selling at prices even with No. 2 foundry, and malleable is strong at $18 in the Valleys for second-half material. There is nothing in the bessemer or basic markets. Bessemer holds at $18.50 in the Valley and basic at $18.75.

Finished Material.—The market is generally dull and inactive. The most inquiry has been for sheets, where the trade has been strong. The market holds at the old prices based on 3.05 for No. 27 black sheets out of stock. The ordering is steady, although not heavy, but the trade is brisk enough to assure that the mills will not be in need of meeting cut-price competition if the present pace is maintained. In bars the whole market is weak. There have been strong rumors of a cut in steel and the understanding is that some of the smaller outside mills would not hesitate to make a sharp reduction in case there was a good choice specification. The association mills, however, are adhering to the old price of 1.60c., Pittsburg. Some big contracts have been made at that price, but upon these the understanding is that the purchasers would not be compelled to suffer, in case there should be a general reduction of prices. The bar iron situation is very weak and the prices have been sagging steadily. It is now generally understood that any one wishing to obtain material might purchase it at the price of steel. The lowest quotation, however, has been 1.70c., Youngstown. The bar mills will resume operations the latter part of the week. The plate situation is fair only. The mills have been looking around for orders and some of the smaller ones, which have been demanding premiums for the past year and a half, have let it be known that they will take orders at association prices. Other mills, which have to purchase their supply of billets, have been trying to obtain a small premium. Specification against contract has been heavy and there seems to be no material letting up in consumption. The structural trade is weak with little being done. The trade has not been satisfactory and even the jobbers are feeling the lightness of trade. The prices have held as the association fixed them, almost without variation. The call for billets has been medium and the price has held at $28.50@$29 at mill. Nothing is being done in rails in this territory and the market is inactive.

Old Material.—The scrap trade is beginning to improve ever so slightly.

New York. July 30.

Pig Iron.—Business shows little improvement and prices still sag. For Northern iron at tidewater prices are: No. IX foundry, $18.25@$18.25; No. 2X, $17.25 @17.75, while No. 2 plain can be had for 50c. less; gray forge, $16.75@$17.25. For Southern iron, on dock, quotations are: No. 1 foundry, $18.25; No. 2, $17.75; No. 3, $17.25; No. 1 soft, $18.

Bar Iron and Steel.—Prices for large lots on dock are: Refined bars, 1.80@1.90c.; soft steel bars, 1.75 @1.90. Trade is chiefly of a retail order.

Plates.—Business is rather light and buying is in small lots. Prices are unchanged. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Steel Rails.—The quotation remains $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight. Relaying rails are $28@$30 for heavy sections and $33@$35 for light sections. Demand for rail-fastenings is good.

Structural Material.—Demand is a trifle better. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. The usual advance is asked for small lots out of stock.

Philadelphia. July 29.

(From Our Special Correspondent.)

Pig Iron.—To-day's reports from the leading brokers and pig iron representatives show that very little change has taken place in the situation since last week. There is a notable absence of heavy buyers and sellers, and there is a manifest indifference among the smaller consuming interests as to whether they purchase iron now, or delay. The representatives of furnaces who are here assert with a good deal of confidence that the tide has turned and that buyers will discover the fact before long. Buyers who have been asked to express their views on this point say that, so far as their knowledge and observation go, the depressing influences heretofore mentioned are still at work. The only pronounced weakness is in gray forge, but this is reasonably explained. Several lots of ordinary gray forge have sold at a very low price. The millmen, even those who have small quantities of iron on hand, are not buying, excepting in a very small way. No. 1 foundry is very quiet. No. 2 foundry is quoted at $17.50@$18; though two or three companies have refused to alter their quotation from $18.50; the average price for No. 2 plain is about $17.25. Standard gray forge may be fairly quoted at $17.50, though sales have taken place at 50c. less; basic is quiet at $17@ $17.50.

Steel Billets.—Local mills are selling small lots of steel billets at something under $29 and only a moderate business is to be done even at that figure. Large consumers have expressed themselves as ready to entertain large offers from makers and it would appear that buyers and sells are closer together this week than for some time.

Bars.—A good deal of bar iron has sold within a few days in a retail way. The class of business we are doing is with the small people. Refined iron has sold at 1.60c. but it is quoted ordinarily at 1.70c. in carload lots. Steel bars are 1.70c.

Sheets.—The placing within 48 hours of three or four good-sized orders for sheets has imparted a stronger tone to this market. Urgent deliveries are being called for on orders placed a month to six weeks ago.

Skelp Iron.—Skelp iron is very quiet, but the makers of it have standing offers for a good deal of stuff at prices which they are not disposed to accept.

Merchant Steel.—There is nothing being done that is deserving of report. No concessions have been openly made.

Pipes and Tubes.—Orders for merchant pipe and other kinds are coming in under specifications on contracts placed some time ago. The new business is rather light, but agents say the mills are getting all the business they can easily handle.

Plates.—The plate market is quiet, though there is no evidence of a weakening on the part of the manufacturers. Carload lots of ¼-in. plate and universals are 1.75c.; small lots of boiler plate have sold at 2c.; business of this kind, though it does not aggregate much, is quite satisfactory.

Structural Material.—A great deal of structural material is now booked for delivery during the next two week. No new orders of magnitude can be traced. Quotations are 1.90@2.10c. for the kind of business that we are doing.

Steel Rails.—Steel rail market is very strong and the only business reported has been in small lots of light sections, for which in some cases as high as $40 were paid.

Old Rails.—Old iron rails are $21.50; old steel rails, $18.75.

Scrap.—Some business in scrap has been forced this week by holders who concluded that they had a little more stock on hand than they felt like carrying. Wrought turnings were sold at $14; No. 2 light scrap at $17.

Pittsburg. July 28.

(From Our Special Correspondent.)

The general iron and steel market has been considerably affected by the marked decline in the various steel stocks last week, but has stood the test quite well. Here and there there is a little slowness in some finished line, but prices of all the heavy products, such as rails, plates, beams, etc., are being strictly maintained.

The American Sheet Steel Company has just announced a special concession of 5c. per 100 lb. on black sheets, which is quoted in such a way that it can be withdrawn at any time, although it is hardly likely that the market will get any firmer as the dull fall season approaches. The sheet market is still a trifle better than in the first two months of the year, when fully as large concessions were made, but it is easier than the market has been since then.

There is decidedly better inquiry this week for foundry pig iron, and some of the inquiries are leading to sales, so that the market on foundry pig is really more active than it has been for several months. While the sales are confined to small lots for early shipment, the volume is gradually increasing, and it is expected that by the middle of next month the market will be quite active. Prices are a shade easier, making them more attractive to consumers, but the principal influence is the fact that the foundries have waited about as long as they could, and now find themselves almost bare of iron, so that they must buy, even if they confine their purchases to early shipments.

Wire products are reported quite active, with prices firm all along the line. Common iron bars are a little lower, and are now on about the same basis as steel bars, for ordinary quality, although iron bars conforming to railroad specifications are still considerably above steel bars.

A conference is being arranged for the latter part of this week between the Pittsburg molders and their employers, and it is likely that the wage matter will now be settled without any serious conflict, some slight concessions being possibly offered to the men.

Pig Iron.—The bessemer market has been very quiet, no sales of any importance having been put through. Furnaces in the Valleys are quoting $18.50 at furnace, although one or two go as low as $18.25, equal to $19.10, delivered Pittsburg. There is some bessemer offered from scattering furnaces as low as $18.85, delivered Pittsburg. It is rumored that the United States Steel Corporation may buy some more August iron, and a meeting is expected to be held the latter part of the week to consider the question. Other steel works are expected to buy some tonnage, and it is expected that within a week or ten days most of the scattered bessemer iron now offered will have been taken up. Several sales of moderate sized lots of foundry pig, from 300 to 1,000 tons, have been made at $17.75@18, for No. 2, delivered Pittsburg. On car-load lots $18.25@18.50 has been done. Gray forge is not moving, but is quoted at about $17.50, delivered Pittsburg.

Steel.—Not much steel has been sold since the mills agreed to maintain uniform prices. Consumers are not better satisfied that the market will be steady, and are not afraid that the market will be jumped up, so that they are buying only as they need to. The new basis is $27 for bessemer billets, 4 x 4, f. o. b. Pittsburg, Wheeling or Valleys, with $1 advance for open-hearth and $1 advance for sheet bars and small billets. The plate market is in good shape, there being a good run of current business, and the base price remains firm at 1.60c. In structural material the market has not been so active as on plates, but the settlement of various strikes in building lines is expected to make tonnage larger for the structural mills.

Sheets.—The sheet market has been quite active, but the leading interest, recognizing the lower prices made by some of the independents, is now quoting on 500-bundle lots prices equivalent to 2.70c. for black and 3.65c. for galvanized, No. 28 gauge. Jobbers report that business this month has been better than in July of last year.

Ferro-Manganese.—There is nothing new in this line. Large lots of 80 per cent are quoted at $50, delivered, and small lots at $52.50.

Cartagena, Spain. July 11.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments for the week were one cargo, 3,935 tons magnetic ore, to Rotterdam. Since the last report little tonnage has been handled. This is, to some extent, due to the strike in Barcelona, which has detained a considerable number of steamers chartered for Cartagena loading. No new orders of any importance have been reported, and business is somewhat dull. This, however, is usually the case at this season of the year. The Subida Iron Ore Company has shipped a cargo of 2,050 tons of its ore from La Calera to Glasgow.

Prices are firm at 6s.@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorus; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f. o. b. Cartagena. Shipments for the week were 300 tons of pyrites to Bagnoli. In addition to these shipments, 2,000 kgs. ocher were exported to Liverpool.

CHEMICALS AND MINERALS.

(See also Prices-Current, Page 186.)

New York, July 29.

The market continues generally quiet, and changes in prices have not been important. Buying is light, and the influence of the holiday season is felt.

Cyanide of Potassium.—At New York sellers quote on the basis of 20c. per lb., but this price may be shaded on a desirable order.

Bleaching Powder.—In the absence of business, prices are nominally unchanged at $1@$1.12½ per 100 lbs., f. o. b. New York, for good imported bleach, and 75c.@$1, f. o. b. works, for domestic.

Acids.—Commercial acids are moving in a moderate way, though at times sulphuric acid orders are more urgent, owing to the improvement in the soda water trade. Prices continue unchanged.

We quote as below, per 100 lbs., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°.....	$1.50	Oxalic, Com'l....	$5.25@$5.50
Muriatic, 20°.....	1.60	Sulphuric, 50°,	
Muriatic, 22°.....	1.75	bulk, ton.....	13.50@14.50
Nitric, 36°.....	4.37½	Sulphuric, 60°...	1.05
Nitric, 38°.....	4.75	Sulphuric, 60°,	
Nitric, 40°.....	5.00	bulk, ton.....	18.00@20.00
Nitric, 42°.....	5.37½	Sulphuric, 66°,	1.20
		bulk, ton.....	21.00@23.00

Brimstone.—Spot best unmixed seconds are quoted at $22.37½@$22.50 per long ton, and shipments at

$22.25—prices that leave a good margin on the actual cost of importing. Best thirds are about $1 less than seconds.

Imports of brimstone into Great Britain for the six months ending June 30 were 10,102 tons, against 12,978 tons in the corresponding period of 1902, a decrease of 2,876 tons, or 22.1 per cent.

Pyrites.—Prices for both domestic and foreign pyrites vary little, as deliveries are being made on long-time contracts.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines, delivered at Atlantic ports.

Imports of iron and copper pyrites into Great Britain for the six months ending June 30 were 400,887 tons, against 315,074 tons for the corresponding period in 1902, an increase of 85,813 tons, or 27.2 per cent.

Nitrate of Soda.—The market is a little more active, and prices are firm in all positions, owing to a higher coast market. Spot is quoted at $2.05 per 100 lbs., and future $2. Ocean freights continue strong, as the amount of disengaged tonnage is small, and with the approach of the European shipping season nitrate of soda is likely to go higher.

European statistical position in June showed deliveries of only 43,040 long tons, the smallest quantity in six months. From January to June, inclusive, deliveries amounted to 618,990 tons, which compares with 742,850 tons last year, showing a decrease of 123,860 tons. The visible supply on July 1, 1903, including stocks and cargoes afloat, was 251,420 tons, which is the smallest quantity reported in a long while, and is 92,480 tons less than July 1, 1902.

Sulphate of Ammonia.—Good gas liquor is in better request, and holders ask $3.15@$3.17½ per 100 lbs., according to position.

Phosphates.—Market firm; shipments good, considering the higher prices asked by high-grade rock people. Further contracts booked for export in the first half of 1904, all at advanced prices.

Phosphates.	Per ton, F. o. b.	United Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (77@80%).	$7.00@$7.50	7¼@7¾d.	$11.31@12.09
*Fla. land peb. (68@73%)..	3.50@ 3.75	5½@5¾d.	7.70@ 8.05
†Tenn. (78@82%) export..	4.00@ 4.25	6½@7d.	10.40@11.20
†Tenn., 78% domestic.....	3.75@ 4.00	.....	.....
†Tenn., 75% domestic.....	3.50	.....	.....
†Tenn., 73@74% domestic..	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic..	2.70@ 2.95	.....	.....
‡So. Car. land rock.....	...@ 3.25	.....	.....
‡S. Car. riv. r'k (55@66%).	2.75@ 3.00	5⅛@5⅝d.	5.95@ 6.53
Algerian (63@70%).....	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%).....	.....	5¼@6d.	6.30@ 7.20
Gafsa (Tunis).....	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80@85%)..	.....	7¼@7¾d.	12.04@12.87

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
†Mt. Pleasant. ‡On vessels, Ashley River.

Imports of phosphates into Great Britain for the six months ending June 30 were 186,387 tons, against 169,335 tons in the corresponding period in 1902, an increase of 17,052 tons, or 10.1 per cent.

Liverpool. July 18.

(*Special Report of Joseph P. Brunner & Co.*)

The market for heavy chemicals is quietly steady, with only a moderate trade passing outside of contract deliveries.

Soda Ash is well controlled by makers, and prices are unchanged at the usual range as to destination. For tierces nearest values may be called about as follows: Leblanc ash, 48 per cent, £5 10s.@£5 15s. per ton; 58 per cent, £6@£6 5s. per ton. Ammonia ash, 48 per cent, £4 5s.@£4 10s. per ton; 58 per cent, £4 10s.@£4 15s. per ton. Bags, 5s. per ton under price for tierces. All net cash.

Soda Crystals are in good demand at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags; special terms for a few favored markets.

Caustic Soda is rather quiet, but quotations are nominally unchanged as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for the Continent and a few other export quarters.

Bleaching Powder is in limited request, buyers being full up on contracts; prices are nominal at about £3 5s.@£4 per ton, net cash, for hardwood packages, as to market.

Chlorate of Potash is dull at 2¾@3d. per lb., net cash, for English make.

Bicarbonate of Soda keeps moving off at £6 15s. per ton, less 2½ per cent, for the finest quality in 1-cwt. kegs, with usual allowances for larger packages; also special terms for a few favored markets.

Sulphate of Ammonia is quiet on spot, but with limited offerings prices are fairly steady at about £13@£13 5s. per ton, less 2½ for good gray, 24-to 25 per cent in double bags f. o. b. here.

Nitrate of Soda is firmly held on spot at £9 15s.@£10 per ton, less 2½ per cent, for double bags f. o. b. here, as to quality.

Foreign Trade.—Exports of chemicals from Great Britain for the half year ending June 30 are given in the Board of Trade returns as follows, in long tons:

	1902.	1903.	Changes.	
Bleaching materials.....	23,336	27,677	I.	4,341
Soda ash.....	32,708	35,839	I.	3,131
Caustic soda.....	32,952	31,100	D.	1,852
Bicarbonate soda.....	8,020	8,100	I.	80
Soda crystals.....	4,474	4,523	I.	49
Soda sulphate (salt cake).....	14,647	23,465	I.	8,818
Other soda compounds.....	7,757	7,306	D.	451
Copper sulphate.....	35,603	45,712	I.	10,109

On the whole, the export trade shows a considerable improvement in quantities this year.

METAL MARKET.

New York, July 30.

Gold and Silver Exports and Imports,

At all United States Ports in June and Year.

Metal	June. 1902.	June. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports.....	$391,525	$12,507,588	$20,276,237	$31,327,483
Imports.....	4,086,457	4,767,553	13,187,344	15,368,199
Excess	E. $3,694,932	E. $7,740,035	E. $7,088,893	E. 15,959,284
Silver:				
Exports.....	$3,250,066	$1,551,410	$22,528,034	$17,426,973
Imports.....	1,802,853	2,050,805	12,220,738	10,340,798
Excess	E. $1,447,213	E. $499,395	E. $10,307,296	$7,086,175

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending July 29, and for the years from January 1:

Period.	Gold. Exports	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week..	$2,000	$8,961	$575,600	$4,392	E. $564,247
1903....	32,161,549	3,583,020	11,972,272	1,174,900	E. 39,375,901
1902....	24,004,088	1,442,169	15,622,990	775,091	E. 36,809,818
1901....	25,756,723	1,936,726	18,917,324	2,289,468	E. 40,677,653

The silver exported during the week went chiefly to London and Havre. The gold imports were principally from Cartagena and Curacoa; the silver from Vera Cruz. To the year's totals of gold and silver exports are added shipments too late for the preceding week.

The week has been one of continued excitement and liquidation on the stock exchanges. Prices have continued to fall, with only a very slight rally. Dealings have been very heavy. The effect on general business has been felt to some extent, but trade appears to be generally active, and to feel the stock market influence much less than might have been expected. Money is in fair supply for business, but less is to be had for speculative purposes. Exchange continues rather low, and the only shipment of gold reported is one of **$500,000 to Canada.**

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending July 10, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts....	$867,653,400	$913,294,500	$907,899,700
Deposits	942,938,500	952,097,200	902,376,800
Circulation	30,637,500	31,997,500	43,819,200
Specie	178,921,200	174,136,600	166,367,100
Legal tenders.....	79,942,000	79,390,100	78,142,500
Total reserve.....	$258,863,200	$253,527,700	$244,509,600
Legal requirements.....	235,734,625	238,024,300	225,594,200
Balance surplus.....	$23,128,575	$15,502,400	$18,915,400

Changes this year, as compared with the previous week, were increases of $664,200 in loans, $7,168,700 in deposits, $5,503,700 in specie, $1,925,000 in legal tenders, and $5,636,925 in surplus reserve; a decrease of $80,700 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd..	$174,136,600	....	$166,367,100	....
England	191,395,500	....	182,778,405	....
France	517,678,770	$224,337,400	512,744,300	$225,091,035
Germany	193,360,000	71,515,000	170,690,300	59,975,000
Spain	71,925,000	92,895,000	72,915,000	102,390,000
Netherlands .	24,249,000	33,573,000	19,699,500	32,538,000
Belgium	15,830,000	7,915,000	14,913,335	7,456,665
Italy	80,935,000	10,314,500	94,460,000	11,630,000
Russia	371,495,000	44,400,000	397,435,000	44,850,000
Austria	220,100,000	63,300,000	226,785,000	65,315,000

The returns of the Associated Banks of New York are of date July 25, and the others July 23, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has fluctuated this week within narrow margins, but in the main has been firm on Eastern buying. The report that our Government had ceased buying for Philippine coinage weakened the price, but on the contradiction of this report the market improved again, but closes quiet, at a lower level.

The United States Assay Office in New York reports receipts of 41,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 16 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.	
India	£3,663,945	£3,347,525	D.	£316,420
China	86,910	235,993	I.	149,083
The Straits.....	70,550	482,229	I.	411,679
Total	£3,821,405	£4,065,747	I.	£244,342

Imports for the week were £51,840 from New York and £46,340 from Australia, a total of £98,180. Exports were £1,000 to Port Said and £62,100 to India, all bar silver; £10,000 in bar silver and £65,000 in Mexican dollars to the Straits; a total of £138,100.

Indian exchange is somewhat easier, and the Council bills offered in London were sold at an average of 15.97d. per rupee. This was partly due to abundance of money in India, and partly to a large increase in the amount remitted in silver. Demand for silver for India has been very much stronger and large purchases have been made.

The foreign merchandise trade of France for the six months ending June 30 is valued by the Ministry of Commerce as below:

	1902.	1903.
Imports	Fr. 2,243,531,000	Fr. 2,386,885,000
Exports	2,085,913,000	2,067,237,000
Excess, imports.....	157,618,000	319,648,000

This shows an increase of 143,354,000 fr. in imports; a decrease of 18,676,000 fr. in exports; and an increase of 162,030,000 fr. in the balance of imports.

The movement of gold and silver in France for the five months ending May 31 is reported by the Ministry of Commerce as below:

Gold—	1902.	1903.	Changes.	
Imports	Fr. 202,740,000	Fr. 107,012,000	D. Fr.	95,728,000
Exports	21,335,000	33,869,000	I.	12,534,000
Excess, imps.	181,405,000	73,143,000	D.	108,262,000
Silver—				
Imports	40,177,000	43,048,000	I.	2,871,000
Exports	38,250,000	31,018,000	D.	7,232,000
Excess imps.	1,927,000	12,030,000	I.	10,103,000

Imports of copper and nickel coins, rated at their face, or coinage value, were 36,000 fr., against 41,000 fr. in the corresponding period of 1901. Exports were 293,000 fr., against 1,372,000 fr. last year.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.42½	$0.44
Peruvian soles and Chinese pesos.....	.39	.42
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	4.88
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

July.	Sterling Exchange.	Silver— N. Y. Cts.	Silver— London Pence.	Copper— Lake, Cts. per lb.	Copper— Electrolytic, Cts. per lb.	Copper— London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	Spelter— N. Y., Cts. per lb.	Spelter— St. Louis, Cts. per lb.
23	4.86⅛	55	25⅝	12¾ @13	12⅝ @12¾	56⅝	27¼	4.05 @4.10	5.62½ @5.67½	5.45 @5.55
24	4.86⅛	54⅞	25⅛	12¾ @13	12⅝ @12⅞	56¼	27¾	4.05 @4.10	5.62½ @5.67½	5.45 @5.55
25	4.86	54½	25⅛	12⅝ @13	12⅝ @12⅞	....	28	4.05 @4.10	5.62½ @5.67½	5.45 @5.55
27	4 86	54¾	25⅛	12¾ @13	12⅝ @12⅞	56½	28¼	4.05 @4.10	5.62½ @5.67½	5.45 @5.55
28	4.85⅞	54⅞	25⅜	12¾ @13	12⅝ @12⅞	57¼	28½	4.05 @4.10	5.62½ @5.67½	5.45 @5.55
29	4.85⅞	54½	25⅛	12¾ @13	12⅝ @12⅞	57¼	28½ to 28¾	4.05 @4 10	5.62½ @5.67½	5.45 @5.55

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25 lower than these figures.

Copper.—The dullness which prevailed for such a long time has at last been followed by a week of activity. Consumers, who had allowed their stocks to run down to a very low ebb, evidently considered that the market had about reached bottom, and a large business developed for home trade as well as for export. If this demand should keep up values will doubtlessly improve. The closing quotations are given as 12¾@13c. for lake; 12⅝@12⅞c. for electrolytic in cakes, wirebars or ingots; 12⅜@12⅝c. for cathodes, and 12¼@12½c. for casting copper.

The market for standard copper in London, which last week closed at £56 5s., opened on Monday at £56 10s., and the closing quotations on Wednesday are cabled at £57 2s. 6d.@£57 5s. for spot and £55 7s. 6d. @£55 10s. for three months' prompt.

It will be noticed that there is a heavy premium on spot copper, owing to the fact that available supplies are said to be controlled by a few strong parties. Besides, most of the better brands of Chile bar copper have for some time past, promptly upon arrival, been absorbed by consumers.

For refined and manufactured sorts we quote: English tough, £60@£60 10s.; best selected, £60 10s.@£61; strong sheets, £69@£70; India sheets, £66@£67; yellow metal, 6¼@6⅝d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week of July 28, and for the year to date were, in long tons:

Exports—	Week.	Year.
Austria	370	3,297
Belgium	50	897
France	300	11,998
Germany	457	14,531
Holland	585	21,987
Italy	10	1,562
United Kingdom	270	9,427
Other countries	213	3,590
Total copper	2,255	67,289
Matte	...	286
Imports—		
Copper	715	15,872
Matte	...	984
Ore	6,844	20,840

Most of the exports reported to Holland are really to Germany, but are cleared through Dutch ports.

Chilean Copper Market.—Messrs. Jackson Brothers write from Valparaiso, Chile, under date of May 16, that sales of bar copper for the first half of May were 27,324 quintals. The current quotation is $34.16, Chilean gold, per quintal, cash on shore. About 1,200 tons of copper matte were sold during the fortnight, current quotations being $14.95, Chilean gold, per quintal, on a basis of 50 per cent copper. Some parcels of copper ore were offered, but sellers were not satisfied to accept the prices offered, and no business was done.

Tin.—The market was quite active throughout the week. Traders took advantage of the scarcity of spot tin and worked prices up from 27½c. to 28½@28¾c., thus establishing a very heavy premium for spot. August is offered at 28c., September at 27¼c. and October at 26½c.

The foreign market, which last week closed at £125 5s., opened on Monday at £125, advanced 10s. on Tuesday, and on Wednesday the closing quotations are cabled as £127 2s. 6d.@£127 5s., for spot, and £124 2s. 6d.@£124 5s. for three months prompt.

Lead has been in good demand, and full prices have been paid for early delivery. The ruling quotations are 4@4.02½c. St. Louis and 4.05@4.10c. New York.

The foreign market is somewhat easier, Spanish lead being quoted at £11 5s. and English lead at £11 7s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is scarce and prices continue to advance. The latest sales are on the basis of about 4.20@4.25c., East St. Louis, for prompt and near-by delivery, for both Missouri and desilverized metal. Futures are obtainable at somewhat less.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartegena, Spain, under date of July 11, that the price of silver during the week has been 13.25 reales per ounce. Exchange remains unchanged at 34.44 pesetas to £1. Local quotation for pig lead on wharf has been 64.50 reales per quintal, which, on current exchange, is equal to £10 9s. 7d. per ton of 2,240 lb., f. o. b. Cartagena. Shipments for the week were 200,000 kgs. soft lead to Liverpool and 200,000 kgs. to Marseilles. There were also 1,006 kgs. silver bars shipped to Marseilles.

Spelter has remained quiet and steady, without any special feature. The ruling quotations are 5.45@5.50c. St. Louis and 5.62½@5.67½c. New York.

The foreign market is easy, good ordinaries being quoted at £20 2s. 6d. and specials at £20 7s. 6d.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter remains steady at 5.50c., East St. Louis. Demand for prompt delivery is very good. For futures it is fair.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of July 11, that there is nothing new in the zinc ore market, and the difference of opinion between producers and buyers still continues. Shipments for the week were 831 tons calamine to Bordeaux.

Antimony is quiet, but steady: Cookson's at 7¼@7½c.; Hallett's, 6½c.; Hungarian, Japanese, Italian, French and U. S. Star at 6¼@6⅜c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Prices of nickel anodes are as follows: 80 to 82 per cent nickel, 45@50c. per lb.; 82 to 84 per cent, 52@57c.; 95 to 97 per cent nickel, 54@59c. The lowest price, in each case, is for lots of 500 lbs. or over; the highest for lots of 100 lbs. or less.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for smaller orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.
No. 1 99% ingots	33@37c.
No. 2 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N.Y.)	80c.
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.

	Per lb.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese, pure (N. Y.)	60c.
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. July 25.

One lot of zinc ore, amounting in weight to 85,160 lbs., was sold at $41 per ton the past week, bringing the top price temporarily to $41, but it is no indication of any general advance in the market, as the ore was the first product of a mine, and several samples assayed 64.5 per cent zinc. Otherwise the market was unchanged from the steady prices that have marked the situation for several succeeding weeks. The assay basis remains at $35@$37 per ton of 60 per cent zinc. There is a peculiar point in connection with the lot of ore bringing $41. It is from what is known as the "Smelter Reserve," being 20 acres of land owned by the Empire Zinc Company, on which a zinc smelter formerly flourished. On account of the old smelter being located thereon, these 20 acres were reserved when the adjoining land was sold several years ago. Two years ago, when the Empire Company began removing the old works to Canyon City, Colo., the land was offered to the Continental Zinc Company, purchasers of the adjoining land, at $24,000, but the offer was declined, as it was not looked upon as mineral land. Recently the land has been priced at $72,000.

Lead ore was generally advanced $1 per ton over the district, selling all the week at $53 per ton. A year ago lead brought only $48, but zinc was $40, the same as now.

Following are the sales of zinc and lead ores from the various camps of the Joplin District for the week ending to-day:

	Zinc.	Lead.	Value.
Joplin	2,662,830	269,250	$56,385
Webb City and Carterville	1,863,830	436,330	43,870
Fortuna	707,620	363,710	23,885
Galena-Empire	708,410	64,900	14,675
Duenweg	700,080	50,950	14,100
Alba-Neck	447,040	.....	8,270
Aurora	341,580	.....	5,400
Reeds	263,320	.....	5,005
Granby	343,000	32,000	4,950
Carthage	197,400	43,980	4,905
Zincite	249,210	.....	4,610
Oronogo	227,640	11,550	4,035
Carl Junction	191,970	4,270	3,660
Prosperity	113,520	24,220	2,620
Cave Springs	69,910	13,080	1,900
Central City	91,250	.....	1,705
Diamond	66,230	.....	1,160
Total sales	9,339,680	1,336,300	$202,640
Thirty weeks	283,608,780	33,534,740	$5,753,135

Zinc value: The week, $166,885; 30 weeks, $4,847,705.
Lead value: The week, $35,755; 30 weeks, $905,430.

The sales of zinc are 330 tons more, of lead 40 tons less, and in value $17,703 more than a year ago. Compared with last week, the zinc sales are 867 tons less, the lead sales 141 tons more, and the value $20,035 less.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	....	28.38	....	4.075	....	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.009	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.089c. per lb.; for February, 4.861c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537 c.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London. Standard. 1903.	Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.991	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	.....	11.771	.....	11.923	....	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.760	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.08
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11,626	.....	11,887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London, Pence.	1903. N. Y. Cents.	1902. London, Pence.	1902. N. Y. Cents.	1901. London, Pence.	1901. N. Y. Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	....	....	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Name of Company.	Date.	Per Share	Total	Total to Date
Amalgamated Copper	July 28	0.30	18,00	519,381
Camp Bird, Colo.	July 28	0.37½	75,000	5,125,000
Alaska-Mexican	Aug 31	.50	769,440	21,964,980
Alaska Treadwell	July 28	.30	295,200	750,000
C. K. & N.	July 16	.01	14,315	57,276
Kendall	July 22	.04	2),0'0	115,000
†Phila. Nat. Gas, crn.	Aug. 1	.75	231,406	3,185,425
†Pittsburg Coal, pf.	July 25	1.75	519,771	7,736,565
Quincy	Aug. 15	3.00	300,000	14,120,000
Tenn. Copper	July 30	1.25	218,750	218,750
Town Topics	.....	.00½	5,000	50,000
†U. S. Steel, com.	Sept. 9	1.00	5,083,025	50,800,577
U. S. Steel, pf.	Aug. 15	1.75	8,923,919	89,262,829

* Monthly. † Quarterly.

ASSESSMENTS.

Name of Company.	Location. No.	Delinq.	Sale.	Amt.
Annandale	Utah ..	July 15	Aug. 8	.00½
Best & Belcher	Nev. ..	July 17	Aug. 7	.15
Chicago & Bingham	Utah ..	July 17	Aug. 6	.00¼
Christmas	Utah ..	July 14	Aug. 8	.00¼
Con. New York	Nev. 18	July 15	Aug. 5	.10
Con. New York	Nev. 18	July 15	Aug. 5	.10
Exchequer	Nev. 42	Aug. 15	Sept. 3	.03
Eutonia	Utah ..	July 13	Aug. 3	.00½
Galena	Utah ..	Aug. 12	Aug. 29	0.05
Highland	Utah ..	Aug. 10	Sept. 1	0.01
Mayday	Utah ..	Aug. 15	Sept. 3	0.02
Martha Washington	Utah ..	July 28	Aug. 8	.01½
Mohave	Utah ..	July 28	Aug. 8	.01½
New State	Utah 5	July 20	Aug. 20	.02½
Savage	Nev. ..	Aug. 25	.....	0.10
Seg. Belcher & Midas	Nev. 32	July 29	Aug. 18	.05
Skylark Copper	Utah ..	July 24	Aug. 10	.00½
Sonora Quartz	Mex. ..	Aug. 20	.....	0.01
South Swansea	Utah 2	Aug. 9	Aug. 25	0.02
Spider	Utah ..	Aug. 12	Sept. 1	.00¼
Tetro	Utah 26	July 25	Aug. 22	.02
Utah Con.	Nev. ..	July 17	Aug. 7	.10

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	July 22. H.	July 22. L.	July 23. H.	July 23. L.	July 24. H.	July 24. L.	July 26. H.	July 26. L.	July 27. H.	July 27. L.	July 28. H.	July 28. L.	Sales.
Adams, Colo.	10						.10								100
Amalgamated c.,Mont	100	1,538,879	46⅞	45¼	45⅝	39¾	41	35¾	40⅜	38	40⅜	37½	43¾	40¼	315,381
Anaconda c., Mont.	15	1,200,000	78	77½	77	70	68	64	69¼	65	74	68	74	72	11,090
Anaconda Gold, Colo.	5	1,000,000													
Belcher, Nev.															
Best & Belcher, Nev.	3	100,000													
Breece, Colo.	25						.20								50
Calendonia, Nev.	2½										1.45				200
Con.Cal.&Va.,g.s.,Nev	2½	210,000	1.30		1.42						1.50				600
Cons. Imperial, Colo.	1	500,000											0		
Crown Point, Nev.	3														
Cripple Creek, c., Colo	1	2,000,000									1½				1,500
Daly, Utah.	3												1.75		200
Gold Dollar, Colo.	1		.46		.46	.45									1,000
Elkton, g., Colo.	1	1,250,000	.04½				.04½				.04½				3,000
Golden Fleece, Colo.	1	600,000			.08										500
Greene Con., c., Mex.	10	720,000	20½	20	20	19½	19½	18¾	19⅛	19	18¾	17¼	18½	18⅛	10,050
Gould & Curry. Nev.	1		.40				.38								600
Hale & Norcross, Nev,	3												.53		300
Iron Silver, Colo.	20		1.80												50
Isabella, g., Colo.	1	2,500,000			.10						.19				2,000
Justice, Nev.	1	105,000	.15												30
Leadville, Colo.	10												.03		125
Little Chief, Colo.	1						.07½								500
Mexican, Nev.	3	100,800											1.00		100
Mollie Gibson, Colo.	5	1,000,000		1											
Moon-Anchor, Colo.	5	600,000									.08½				100
Ophir, Nev.	1	100,800					1.45	1.40			1.55				60
Overman, Nev.	1	115,200			.32		.30								600
Pharmacist, Colo.	1	1,500,000			.03										1,000
Portland, Colo.	10	3,000,000			1.35	1.32					1.20				700
Potosi, Nev.	3	112,000									.23	.20			400
Savage, Nev.	2½	112,000	.15												200
Sierra Nevada, Nev.	3	100,000					.52						55	54	500
Silver Hill, Nev.	1	180,000					.75								200
Small Hopes, Colo.	20	250,000											30		300
Standard, Cal.	10												2.65		125
Tenn., c., Tenn.	25	175,000	28	26			25	24½	25	24			25		820
Union Con., Nev.	2½	10 ,000													
Union Cop., N. C.	10	300,000	1¼		1¼	1⅛	1		1	⅛			1⅛		4,326
Uni'd Cop. com.,Mont	100	450,000	18⅛	18⅛	18¼	18	17½	15	16¾		16¾		16¾	15⅝	1,000
Utah, Nev.	1														
Vindicator, Colo.	1	1,500,000													
White Knob, g. s., Ind.	100	150,0 0			.10½		.09½	8½	9	8½	9¼	8	10	9	1,265
Yellow Jacket, Nev.	3	120,000			.68	.64	.66								300

Total sales 31,457 shares. †Ex-Dividend

BOSTON, MASS.*

Name of Company.	Par val	Shares listed	July 22 H.	July 22 L.	July 23 H.	July 23 L.	July 24 H.	July 24 L.	July 25 H.	July 25 L.	July 27 H.	July 27 L.	July 28 H.	July 28 L.	Sales.
Adventure Con., c.	$25	100,000	5	4¾	5½	5	5¾		5		5⅜	4⅞	6	5¼	1,785
Allouez.	25	99,511	4½	4¼	4⅞	4¾	5	4¾	4¾	4½	5	4⅜	5½	5	2,338
Amalgamated, c.	100	1,538,879	41	36	46	40	46¾	45	40⅜	38¼	40¾	37½	43¾	40½	57,569
Am. Gold Dredging.	5	90,000													
Am. Z. L. & Sm.	25	60,000													
Anaconda	25	1,200,000	17⅝	15⅝									19		100
Arcadian, c.	25	150,000	1¾	1⅜	1¾		2						2	1⅞	1,240
Arnold	25	60,000													
Atlantic, c.	25	100,000	8¾	8½									9¼	8½	540
Bingham Con., g. s.	50	150,000	22	20¼	23	22¼	23	22½	21¾	21	22½	21⅜	23	22	3,625
Bonanza.	10	300,000			.50		.50				.50		.50		650
British Columbia.	5	256,500	4												48
Cal. & Helca, c.	25	100,000	420	400	425	420	428	425	415		410		430	415	108
Centennial, c.	25	90,000	14¼	12	16	14⅜	16	15	14	13½	14	13	15¼	14½	6,511
Central Oil.	25	60,000			8½		10								65
Con. Mercur, g.	5	1,000,000	1½		1½		1½		1½		1½		1½		4,600
Copper Range Con.	100	285,000	42	37	47¾	41⅜	47¾	46¼	41	38¼	42	38	44	41½	23,692
†Daly-West.	20	180,000	40	37	41	40	41¼	40½	39⅜	38	37	37¾	40	39	1,971
Dominion Coal.	100	150,000	93	88½	96	93	96		90½	89¾	91	90	95	92	3,200
Dominion Coal, pf.	100	30,000					114				112				135
Dominion I. & S.	100	100,000	12½	11¼	14	11	14¾	14⅛	12½	11⅛	11⅜		13⅛	12¾	3,800
Elm River.	12	100,000	2½		2⅝		2¾	2⅝	2½				2¾		495
Franklin, c.	25	100,000	7	6¾	7¾	7	7¾	7¼	7½	7¼	7¾	7¼	8⅜	8¼	1,250
Granby Con.	10	1,336,303	3¾						3¾		3¾		3¾		2,250
Guanajuato Con.	5	385,000			1		1				1		1⅛		800
Isle Royal Con., c.	25	385,000	6¾	5			7				6	5¾	7	6	2,355
Mass Con., C.	25	100,000	4¾	3	5				4	3	4¼	4	5	4½	947
Mayflower, c.	25	100,000	1¼												100
†Michigan, c.	25	100,000	6½	5⅞	7		7¼		6⅝	6	7	6	7½	7	980
Mohawk, c.	25	100,000	34	31	36¾	35	37	36½	33½	32	33¼	32	35¾	34	5,818
Mont. Coal & Coke.	25	200,000													
Mont'l & Boston, c.	5	570,000	.80	.75	1.00				.75				.85	.75	1,170
New Idria.	5	100,000					8¼								150
Nova Scotia St. & C.	100	37,023													
Nova Scotia St.&C., pf.	100	16,300													
Old Colony, c.	25	100,000											1¼	1	1,480
Old Dominion, c.	25	150,000	10½	10	11¼	10½	11		10¼	9¼	10	8⅞	10	9⅝	5,138
Osceola, c.	25	96,150	50	43	49	47⅜	50		49	48	50½	47	53	50	4,127
Parrott, s. c.	25	229,850	17	16	18¾		19	18	17		17	16	18½	17¼	3,068
Phœnix Con, c.	25	100,000	3¾				4	3¾					4¼	4	110
Quincy, c.	25	100,000	†96	90	99	97	100	98	97¼		90	85	90		338
Rhode Island, c.	25	100,000			1¼		1⅜	1¼					1½		300
Santa Fe, g. c.	10	250,000	1½	1			1¼				1¼		1½		250
Shannon, c.	10	188,153	9¼	9	9½	9	9¾		9		10⅜	8¾	10½	10	2,412
Tamarack, c.	25	60,000	80	76	86	80	88	85			90	76	85		451
Tecumseh	25	80,000													
Tennessee	25	100,000													
Trimountain	100	450,000	82	80	83	81	84	83	81½		82				2,103
Trinity, c.	25	419,000	4¾	4	4⅞	4¾	5	4⅞	4¾		5	4⅝	5½	5	4,280
United c.	25	240,000													
United States, g.	10	300,000	17¾	16⅜	18⅝	17⅝	19	18⅜	17⅜	17	17½	16¾	18¼	16¾	15,887
U. S. Coal & Oil.	25	100,000	10	9¾	10½	10	10¾	10½	10	9⅞	10	9⅝	11	10	3,8 0
Utah Con., g.	25	100,000	24	22	25	24	25	24	23½	23	24	22½	25	23¾	8,028
†Victoria.	25	60,000	3¼	3	3¼		3¼	3			3½		4¼	3½	1,550
Winona, c.	25	100,000	7⅛	5¼	7¼		8	7⅛	6½	6¼	7¼	6¼	7¾	7	1,916
Wolverine, c.	25	60,000	62		62	62¾	63¾		58	55	57	54	61	59	323
Wyandot.	25	100,000					1¼		1¼		1¼				600

*Boston Stock Exchange. †Ex Dividend. ‡Assessment Paid. §Holiday. Total sales, 184,592 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	July 17. H.	July 17. L.	July 18. H.	July 18. L.	July 20. H.	July 20. L.	July 21. H.	July 21. L.	July 22. H.	July 22. L.	July 23. H.	July 23. L.	Sales
Central Eureka.	Cal.	$400,000											.90		1,000
Colehan.	Nev.	1,000,000	.18	.15			.21	.19					.18	.17	2,500
Draper Gold Mfg. Co.	Cal.	500,000													
Esperanza.	Nev.	1,000,000	.06		.06		.06		.06		.03	.06	.06	.05	31,000
Gipsy Queen.	Nev.	750,000			.27		.27				.27				1,200
Gold Min. Con.	Nev.	750,000					13	.11							600
Lucky Tom.	Nev.	1,000,000	.10				10								400
MacNamara.	Nev.	500,000	.23								.25	.23	.20		2,200
Mont-Tonopah.	Nev.	1,000,000	.93	.90	.94	.91	1.00	.95	1.00	.99	.99	.96	.97	.94	7,715
New York Tonopah.	Nev.	1,000,000	.10												100
Paymaster.	Nev.	750,000	.17												100
Rescue.	Nev.	500,000	.16				.18	.14			.17	.16	.16	.14	6,275
Tonopah-Belmont.	Nev.	2,000,000									2.00		1.97½	1.94	400
Tonopah & Cal.	Nev.	2,000,000			.40	.35	.38	.36	.40	.38					3,500
Tonopah Fraction.	Nev.	750,000													
Tonopah Midway.	Nev.	1,000,000													
Tonopah Mg. Co.	Nev.														
Tonopah North Star.	Nev.	750,000	.53	.46			.59	.53	.60	.58	.56	.53	.51	.50	9,300
Tonopah Union.	Nev.	750,000													
Utopia.	Nev.	1,000,000											.54		500

*San Francisco & Tonopah Mining Exchange. Total sales 67,790 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val.	Shares Issued.	July 22. H.	July 22. L.	July 23. H.	July 23. L.	July 24. H.	July 24. L.	July 25. H.	July 25. L.	July 27. H.	July 27. L.	July 28. H.	July 28. L.	Sales
Allis-Chalmers, U. S.	$100				11⅞								13		600
Allis-Cham's, pf, U. S.	100	200,000													
Am. Agr. Chem., U. S.	100														
Am.Agr.Chem.,pf,U.S.	100	181,350													
Am. Sm. & Ref., U. S.	100	500,000	43½	42¼	43	41⅜	42	37½	41¾	39½	41¾	38½	33	41	48,903
Am.Sm. & Ref.,pf,U.S.	100	500,000	91	90⅜	90¾	86½	90¼	89	91	89½	91	90½	91	90	6,859
Am. Steel & Fdy., U.S.	100										10				100
Am. S. & Fdy., U. S.	100	155,000									50				100
Col. Fuel & I., Colo.	100	239,320	51½	49¼	49	45½	45⅜	41	42⅜	41	43	40	54	43½	7,300
Col. & H. C. & I., Colo.	100	69,244	‡14¾	13¾	14⅞		13¾	13¼	14	13½	15	13½	13⅝	13¾	3,045
†Crucible Steel, U. S.	100	250,000	12	11	12	11¾	11¾	11½			11¾	11½	12	21¾	3,311
†CrucibleSteel,pf,U.S.	100	250,000	75	74	75⅝	74½	74½	72⅝	73		73	72	75	73½	1,991
†Mong. R. Coal, Pa.	50	200,000	10½	10¼	10¼		15¼		10¼		16¼		10½		2,738
†Mong. R. Coal, pf, Pa.	50	98,300	38¼	38¼	38¾		39	38	38¾	38½	38¾	38⅜	38¾	38¼	1,472
National Lead, U. S.	100	149,054	15½	15⅛	15½		15	14⅜	15	14⅛	14⅛	11⅞	14	13¼	5,010
National Lead, pf, U.S.	100	149,040			83¼		81	80¼	a		79¾				280
†Phila. Nat. Gas.	100	308,542	40	39¾	40½		40				3 ½		40½		740
†Phila. Nat. Gas, pf.	100	212,873													
†Pittsburg Coal, Pa.	100	300,307	27¾	25½	27½		27	26¾	26¼	26	26⅝	25½	26½	26⅜	2,615
†Pittsburg Coal,pf,Pa.	100	297,012	85	84	85		84¼	83	84	83	83½	83	84½	83½	2,615
Republic I. & S., U. S.	100	273,520	12½	12¼	12½	12¼	12⅜	11	11½	10½	11¾	10½	12⅞	11½	6,870
Republic I.&S.,pf,U.S.	100	203,569	70	68	69	67½	64	64¼	65¾	64⅝	66	64⅜	67	65½	11,085
Sloss-Shef S. & I., Ala.	100	75,000	38½	37¾	37½	34¼	33¼	28	31	29	33	32½	32½	31	8,425
Sloss-ShefS.&I.pf,Ala.	100	65,085			80¾		99								200
Standard Oil, U. S.	100	970,000	733	625	634	624¼	60½	595	600	580	600	585	625	609	536
Tenn. C.I. & R.R.	100	225,000	44	41¼	42⅝	38¼	40½	37½	39¼	37½	40	36	40¾	39½	47,460
U.S. Red. & Ref., U. S.	100	59,188													
U.S.Red&Ref.,pf, U.S.	100	39,485													
U.S. Steel Corp., U. S.	100	5,084,952	24½	22½	23⅞	11⅞	23½	21⅜	23¾	22⅝	24⅝	22¼	24⅞	23¾	337,240
U.S. SteelCrop.pf,U.S.	100	5,103,141	72¾	70¼	72	70⅜	71	68½	70⅞	69¾	71⅜	69½	73	71⅝	168,259
Va.-Car Chem., U. S.	100	279,844	43½	41	43¼	41	40¾	37½	39	38	37	34	39¾	35½	20,752
Va.-Car Chem.,pf,U.S.	100	120,000					106	104⅞	108	105	103	100	100	100	2,414
Va. I. C. & Coke, U. S.	100	86,416	24½	24			23				23				600

*New York Stock Exchange. †Pittsburg Stock Exchange. ‡Ex-dividend. Total sales 696,392

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	July 18 H.	July 18 L.	July 20 H.	July 20 L.	July 21 H.	July 21 L.	July 22 H.	July 22 L.	July 23 H.	July 23 L.	July 24. H.	July 24. L.	Sales
Acacia.	$1	1,500,000	.07½	.07¼	.07½	.07	.07½	.07	.07½	.07	.07½	.07	.07½	.07	
Am. Con.	1	2,000,000	.02½		.02		.02		.02		.02		.02		2,000
Anaconda	1	1,000,000	.12		.11½	.10	.12	.10½	.12	.10½	.12	.14	.11	.10	1,000
Ben Hur.	1	900,000	.01¾		.01¾						.06	.05	.06	.05	
Blue Bell.	1	1,000,000	.05		.06	.05	.06	.05	.06	.05	.02½	.02¼	.02¼		6,000
C. C. & M.	1	1,000,000	.02½		.02¼		.02¼		.02½		.23	.21	.23	.21	1,500
C. K. & N.	1	1,250,000	.21	.22	.22½	.21	.23	.21	.23	.20	.04½	.04	.05	.04	2,000
C. C. Con.	1	2,000,000	.05	.04	.04		.04		.04⅜	.04	.02½		.02¼		
Coriolanus.	1	1,500,000	.02½		.02¼		.02½		.02½		.03½	.02½	.03½	.02½	
Des Moines.	1	750,000	.03½	.02			.02		.03½	.02½	.99	.98½	.09	.08⅞	5,500
Dr. Jack Pot.	1		.09	.08¾	.09	.08½	.09	.08¾	.49	.08¾	.43	.49	.49		11,181
Elkton Con.	1	1,250,000	.40¾	.40	.42	.40¼	.45	.45	.42	.40½	.59	.56½	.56		7,550
El Paso.	1	900,000	.60	.50	.58½	.55½	.59	.56½	.60	.55½	.90¾		.03¾	.03½	
Fannie Rawlings.	1	1,000,000	.03½		.03¾		.03¾		.03¾		.14½	.14	.15½	.24	2,000
Findley.	1	1,250,000	.14¼	.14	.14½	.13½	.14¼	.13⅝	.14¼	.14	.02½	.02	.02¼	.00	2,000
Gold Bond.	1	1,000,000	.03	.02¾	.02½	.02⅝	.02½	.02¼	.02½	.02	.05	.04½	.04¾	.04½	13,001
Gold Dollar Con.	1		.04⅞	.04¾	.04⅞	.04¾	.04¾	.04½	.04¾	.04½					7,300
Golden Cycle.	1	2,000,000	.70	.69	.70	.68					.20		.20		
Golden Fleece.	1	600,000	.20		.20		.20		.20		.03	.02¾	.02⅞	.02¾	1,000
Gould	1	1,250,000	.03		.03	.02¾	.03	.02¾	.03	.02¾					
Hart.	1	1,000,000	.05	.02½	.05	.02½	.05	.02½	.05	.02½					
Isabella	1	2,500,000	.11¼	.00⅝	.11	.10¼	.11	.10½	.11	.10½	.11¼	.10⅝	.11¾	.11	2,500
Jack Pot.	1	1,250,000			.10										
Last Dollar.	1	1,500,000	.50		.50		.60	.50	.51	.50	.75				12.000
Lexington.	1	1,500,000	.04	.03¾	.03¾	.03⅝	.04	.03⅝	.03¾	.03½	.03⅝	.03½	.03⅝	.03½	8,000
Little Puck.	1	2,000,000	.03	.02	.02		.03¼	.02	.02		.02		.03	.90	
Mollie Gibson	5	1,000,000	.05½		.05½		.05½		.05½		.06		.06		2,000
Moon-Anchor.	1	600,000	.09½	.08	.09	.08	.08½	.08	.09	.08	.09	.08	.09	.08½	2,000
New Haven.	1	1,500,000	.03	.02¼	.02¾	.02½	.02	.02	.02¾	.02¼	.02½	.20½	.02¾	.02¾	
Pharmacist, Con.	1	1,500,000	.03½	.03	.03½	.03	.03½	.03⅞	.03½	.03⅜	.03½	.30½	.03⅞	.03¼	5,000
Pinnacle	1	2,000,000	.03⅞		.04		.03¾		.03¾		.03¼		.03¾		
Pointer.	1	1,250,000	.01½	.01			.009		.009		.009		.009		2,000
Portland	1	3,000,000	1.30	1.25	1.30		1.30	1.24	1.30	1.25	1.30	1.25	1.30	1.15	600
Prince Albert.	1	3,000,000	.02		.02		.02⅜	.02	.02½	.02¼	.02½	.02	.02¾	.02	
Vindicator	1	1,500,000	.90	.80	.90	.85	.90				.00		.85	.75	
Work	1	1,500,000	.05½	.05⅝	.05¼	.04	.05	.04¾	.05¼	.05	.05½	.50⅜	.05⅜	.05½	7,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 103,131 shares.

COLORADO SPRINGS (By Telegraph).

Name of Company.	July 27. H.	July 27. L.	July 28. H.	July 28. L.	Name of Company.	July 27. H.	July 27. L.	July 28. H.	July 28. L.
Acacia.	.07½	.07	.07½	.07	Isabella.	.11½	.11	.11¼	.10
Am. Con.	.02½	.01½	.02½	.01½	Jack Pot.	.10	.08	.10	.08
Anaconda	.11	.10½	.11	.10½	Keystone.	.04	.03¾	.04	.03⅝
Blue Bell	.05¾	.05	.05¾	.05	Last Dollar.	.75	.32	.50	.35
Cripple Creek Con.	.05	.04	.04½	.04	Lexington.	.04	.03½	.03⅝	.03⅞
C. K. & N.	.21¼	.20½	.20⅝	.20½	Little Puck.	.03	.02	.03	.02
Doctor Jack Pot	.09½	.08¾	.09	.08¾	Mollie Gibson.	.06	.05	.06	.05
Elkton, Con	.42	.40½	.41	.40	Moon Anchor.	.09	.08¼	.09	.08¼
El Pasco.	.58	.57½	.58	.57½	Old Gold.	.07¾	.07	.07⅜	.07
Findley	.14¼	.13¼	.14¼	.13¼	Pharmacist	.03½	.03	.03¼	.03
Gold Dollar Con.	.04½	.04⅜	.04½	.04⅜	Pinnacle.	.03⅝	.03	.03⅝	.03
Golden Cycle.	.68	.65	.68	.64¾	Portland.	1.30	1.15	1.25	1.15
Golden Fleece.	.20	.06	.2	.06	Vindicator.	.90	.75	.85	.50
Gould	.02⅞	.02¾	.03	.02½	Work.	.06½	.05	.05½	.05

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	July. 27.	July. 28.	Name of Company.	Shares Issued.	July. 27.	July. 28.
Belcher	104,000	.42	.42	Justice.	105.000	.32	.12
Best & Belcher.	100,800	1.85	2.00	Mexican.	100,800	1.05	1.10
Caledonia.	100,000	1.30	1.30	Occidental Con.	100,000	.38	.38
Challenge Con.	50,000	.45	.42	Ophir.	100,800	1.55	1.55
Chollar.	112,000	.20	.19	Overman.	115,200	.25	.28
Confidence.	24,980	1.20	1.20	Potosi.	112,000	.23	.21
Con. Cal. & Va.	216,000	1.45	1.45	Savage.	112,000	.16	.16
Con. Imperial.	500,000	.03	.03	Sierra Nevada.	100,000	.55	.54
Crown Point.	100,000	.20	.18	Union Con.	100,000	.81	.81
Gould & Curry.	108,000	.40	.38	Utah Con.	100,000	.35	.34
Hale & Norcross.	112,000	.50	.49	Yellow Jacket.	120,000	.67	.67

STOCK QUOTATIONS

MEXICO*. July 17.

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos	2,400	5.00	100	90
Cinco Senores y An., aviadoras	2,000	15.00	190	195
Cinco Senores y An., aviada	400	10.00	175	185
Providencia, SanJuan de la Luz	6,000	2.00	165	175
Queensland y Australia	300	.....	95	105
Guerrero:				
Delfina, 1st serie	2,500	.....	40	45
Delfina, 2nd serie	2,500	.....	30	35
Garduno y Anexas	7,200	.....	45	60
Hidalgo:				
Amistad y Condordia	9,000	6.90	85	86
Carmen, aviada	1,100	.....	140	150
Guadalupe Fresnillo Mill	1,000	.....	200	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,538	.....	.....	.....
La Blanca, aviada	768	.....	.....	.....
La Reina y An., aviadora	5,600	.....	21	22
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	105	140
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada	12,800	.....	6	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,600	.....	8	10
Sta. Gertrudis y An., aviadora	28,800	1.00	89	90
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	18	20
San Felipe de Jesus, aviada	1,200	.....	.....	10
San Rafael y An., Trompillo	1,200	12.00	1,420	1,450
San Rafael y An., aviada	1,200	4.00	540	550
Soledad, aviada	960	.....	470	490
Sorpresa, aviada	960	5.00	330	335
Mexico:				
Alacran	2,400	.....	60	70
Aldebarren	.....	.....	135	140
Buen Despacho	2,000	.....	92	100
Dos Estrellas	3,000	30.00	3,050	3,090
La Esperanza (El Oro.)	3,000	10.00	1,500	1,510
La Reformia, aviadores	2,000	.....	85	90
Providencia, pagadoras	1,000	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	80
Michoacan:				
Luz de Borda, aviadora	3,000	.....	105	110
Luz de Borda, aviado	1,000	.....	45	46
Nuevo Leon;				
La Fraternal	1,000	.....	550	600
Norias de Bajan	1,000	.....	700	800
Santiago y An., Tlal.	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.	3,000	.....	98	105
El Barreno, aviadora	2,000	2.00	30	35
Sta. Maria de la Paz	2,400	20.00	680	700
San Diegoy Annexas	2,400	4.00	22	28
Zacatecas:				
Asturiana y An.	2,500	.....	70	80
Candelaria y Pinos	2,500	10.00	250	260
Cubiertas	2,400	.....	.....	.....
Esperanza y An.	2,400	.....	50	62
Lourdes	2,500	.....	35	45
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	80	95
Nueva Quebradilla, aviadas	600	.....	50	70
San Carlos y Annexas	2,500	20.00	130	150
Sta. Maria de Gaud	2,500	10.00	75	85
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.)	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,100
Natividad (Oaxaca) aviadas	600	4.00	1,000	1,100
San Francisco Hac.	6,000	1.00	56	60
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

LONDON. July 16.

Name and Country of Company.	Shares Issued.	Par value. £	s.	d.	Latest dividend. Amt. s.	d.	Date.	Quotations. Buyers. £	s.	d.	Sellers. £	s.	d.
Alaska-Treadwell, g., Alaska	200,000	5	0	0	3	0	Apr., 1903	4	12	6	4	17	6
Anaconda, c. s., Montana	1,200,000	5	0	0	2	0	May, 1903	4	2	1	4	5	0
Arizona, c., Def., ord	63,444	1	0	0	5	6	Feb., 1903	7	15	0	8	5	0
Arizona, pref., ord	316,350	1	0	0	5	6	Feb., 1903	8	0	0	8	5	0
Camp Bird, g., Colorado	738,000	1	0	0	1	6	July 1903	1	6	1	1	8	3
Central Chile, C., Chile	276,248	1	0	0	.....		.....		3	0		4	0
Copiapo, c., Chile	112,500	2	0	0	6	10	May, 1903	1	15	0	2	0	0
De Lamar, g. s., Idaho	80,000	1	0	0	2	0	Nov., 1902		10	0		12	6
El Oro, g., Mexico	1,000,000	1	0	0	1	6	Dec., 1902	1	13	9	1	16	3
Frontino & Bolivia, g., Columbia	128,662	1	0	0	3	0	July, 1901		15	0		17	6
Le Roi, g., British Col	200,000	5	0	0	5	0	Nov., 1899	1	2	6	1	5	0
Le Roi No. 2, g., British Col	120,000	5	0	0	5	0	May, 1902	1	1	3	1	2	9
Mesquital, Mexico	250,000		2	0		3	Feb., 1903		2	6		3	6
Montana, g. s., Montana	657,128	1	0	0		6	April 1899		1	9		2	3
Mountain, c., Cal	250,000	5	0	0	4	0	Nov., 1902	3	2	6	3	7	6
Stratton's Independence, Colorado	1,000,007	1	0	0		6	Apr., 1902		9	3		9	9
*St. John del Rey., g., Brazil	546,265	1	0	0		8	June, 1903		15	6		16	3
Utah Con., g . c. (Highland Boy), Utah	300,000	1	0	0	7	0	Jan., 1903	5	10	0	6	0	0
Ymir, g., British Col	200,000	1	0	0	1	0	Mar., 1902		6	3		8	9
European:													
Linares, l., Spain	15,000	3	0	0		9	Oct., 1902	2	0	0	2	10	0
Mason & Barry, c., sul., Port'g'l	185,172	1	0	0	11	0	May, 1903	3	10	6	3	15	0
Rio Tinto, c., Spain	325,000	5	0	0	27	6	Apr., 1903	46	12	0	46	17	6
Rio Tinto, pref., Spain	325,000	5	0	0	2	6	Apr., 1903	6	0	0	6	5	0
Tharsis, c., Spain	625,000	2	0	0	6	0	May, 1903	3	17	6	4	2	6
Australia and New Zealand:													
Assoc. Gold Mines, W. Australia	495,388	1	0	0	2	0	July, 1903	1	18	9	2	1	3
Briseis, tin, Tasmania	600,000	1	0	0	.....		.....		5	9		6	3
Broken Hill Pr'p, s., N. S. Wales	960,000		8	0	1	0	Feb., 1903	1	8	0	1	9	0
*Cosmopolitan Prop., W. Australia	385,000	1	0	0		6	July, 1902		12	3		12	9
Golden Horse Shoe, W. Australia	300,000	5	0	0	6	0	Apr., 1903	8	12	6	8	17	6
Great Fingall Con., W. Australia	250,000	1	0	0	5	0	Sept., 1902	7	15	0	7	17	0
Great Bo'd'r Pr'p, W. Australia	1,750,000		2	0		6	June, 1903	1	7	6	1	8	0
Ivanhoe Gold Corp., W. Australia	200,000	5	0	0	4	0	Jan., 1903	8	13	9	8	16	3
Kalgurli, g., W. Australia	120,000	1	0	0	2	6	July, 1903	4	6	3	4	8	9
Lake View Cons., g., W. Australia	250,000	1	0	0	rts.		Aug., 1902	2	8	9	2	11	3
Mt. Lyell M. & R. I., c., Tasmania	275,000	3	0	0	1	0	July, 1903	3	0	0	3	2	6
*Mt. Morgan, g., Queensland	1,000,000	1	0	0		3	May, 1903	3	0	0	3	2	6
Waihi, g., New Zealand	497,412	1	0	0	2	6	June, 1903	5	3	9	5	6	3
Indian:													
Champion Reef, g., Colar Fields	473,000		10	0	4	6	May, 1903	7	6	3	7	8	9
Mysore Gold, Colar Fields	595,043		10	0	4	0	July, 1903	7	0	0	7	2	6
Nundydroog, g., Colar Fields	484,000		10	0	1	6	Mar., 1903	2	10	0	2	12	6
Ooregum, g., Colar Fields	343,000		10	0	1	6	Apr., 1903	1	11	3	1	13	9
Ooregum, g., pref., g., Colar Fields	240,000		10	0	1	6	Apr., 1903	1	18	9	2	1	3
African:													
Angelo, g., Transvaal	600,000	1	0	0	6	0	July, 1903	7	0	0	7	2	6
Bonanza, g., Transvaal	200,000	1	0	0	10	0	June, 1903	4	2	6	4	5	0
British South Africa	4,436,019	1	0	0	rts.		May, 1889	2	13	9	2	16	3
Cape Copper, S. Africa	300,000	2	0	0	1	0	June, 1903	2	10	0	2	12	6
Cape Copper, pref., S. Africa	75,000	2	0	0	1	0	June, 1903	2	10	0	2	15	0
City and Sub'n (New), g., Transvaal	340,000	4	0	0	4	0	Aug., 1903	6	12	6	6	15	0
Crown Reef, g., Transvaal	120,000	1	0	0	4	0	June, 1903	16	15	0	17	5	0
De Beers Con., d. pref., Cape Colony	800,000	2	10	0	10	0	July, 1903	19	6	3	19	8	9
De Beers Con., def	1,000,000	2	10	0	15	6	Mar., 1903	19	13	9	19	18	9
East Rand, Prop., Transvaal	970,000	1	0	0	5	0	June, 1903	7	7	6	7	8	9
Ferreira, g., Transvaal	90,000	1	0	0	15	0	June, 1903	20	15	0	21	5	0
Geldenhuis Est., g., Transvaal	200,000	1	0	0	6	0	June, 1903	6	6	3	6	8	3
Geduld, g., Transvaal	400,000	1	0	0	rts.		Mar., 1902	6	11	3	6	16	3
Henry Nourse, g., Transvaal	125,000	1	0	0	10	0	Feb., 1903	9	2	6	9	7	6
Jagersfontein, d., Orange, F. S.	200,000	5	0	0	6	0	Nov., 1889	28	17	6	29	2	6
Jubilee, g., Transvaal	50,000	1	0	0	5	0	June, 1903	5	0	0	5	5	0
Jumpers, Transvaal	100,000	1	0	0	5	0	Aug., 1899	3	10	0	3	15	0
Langlaagte Est., g., Transvaal	470,000	1	0	0	3	0	Sept., 1903	3	18	3	4	1	1
May Con., g., Transvaal	288,750	1	0	0	3	0	July, 1903	4	2	6	4	5	0
Meyer & Charlton, g., Transvaal	100,000	1	0	0	3	0	Feb., 1903	4	7	6	4	12	6
Modderfontein, g., Transvaal	290,000	1	0	0	rts.		Apr., 1902	9	16	3	9	18	3
Namaqua, c., Cape Colony	94,331	2	0	0	2	0	June, 1902	2	17	6	3	0	0
Primrose (New), g., Transvaal	325,000	1	0	0	2	0	Feb., 1903	2	16	3	2	18	9
Rand Mines, g., S. Africa	1,795,956		5	0	4	0	June, 1902	10	2	6	10	3	9
Robinson, g., Transvaal	750,000	5	0	0	5	6	Aug., 1903	10	8	3	10	11	1
Robinson Deep, g., Transvaal	950,000	1	0	0	10	0	May, 1903	4	15	0	4	17	6
Rose Deep, Transvaal	425,000	1	0	0	2	0	Feb., 1903	8	12	6	8	17	1
Salisbury, g., Transvaal	100,000	1	0	0	2	0	Mar , 1889	2	7	1	2	17	6
Sheba, g., Transvaal	1,075,000	1	0	0		6	July, 1898		17	6		18	3
Village Main Reef, Transvaal	400,000	1	0	0	5	0	Oct., 1902	8	0	0	8	2	6
Wemmer, Transvaal	80,000	1	0	0	5	0	May, 1903	11	10	0	12	0	0

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. *Ex-Dividend.

SALT LAKE CITY.* July 4.

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	$10	300,000	.24	.23	1,000
Ben Butler	1	500,000	.14	.14	500
California	1	300,000	.....	.....	.....
Carisa	1	500,000	.....	.....	.....
Century	.....	.....	.41	.39⅞	600
Con. Mercur	5	1,000,000	1.55½	1.50	5,250
Daly	20	150,000	.....	.....	.....
Daly-Judge	1	300,000	9.95	9.90	130
Daly-West	20	300,000	41.00	40.75	139
Grand Central	1	250,000	4.45	4.45	100
L. Mammoth	1	150,000	.95	.78	13,900
L. Washington	½	300,000	.....	.....	.....
Mammoth	25	400,000	1.00	1.00	100
Majestic Cop	.....	.....	.....	.....	.....
May Day	½	400,000	.14¼	.13⅝	9,700
N. Y. Bonanza	.....	.....	.34	.31	5,400
Petro	100	10,000	.....	.....	.....
Sacramento	5	1,000,000	.24¼	.23¼	1,000
Silver Shield	.....	.....	.09	.08¾	5,100
South Swansea	1	300,000	.....	.....	.....
Star Con	1	500,000	.28⅛	.27¾	6,700
Uncle Sam	1	500,000	.28⅛	.22½	23,800
Utah	10	100,000	.....	.....	.....
Victor	1	500,000	.....	.....	.....
Wabash	.....	.....	.23½	.23	4,000
Yankee Con	1	500,000	.34	.33½	1,000

*By our Special Correspondent. All mines are in Utah. Total sales, 81,219 shares.

LONDON (By Cable.)*

Name of Company.	July 21. £	s.	d.	July 28. £	s.	d.	Name of Company.	July 21. £	s.	d.	July 28. £	s.	d.
Anaconda	4	5	0	..	..	..	Jagersfontein	..	..	..	..	..	..
British South Africa	..	..	..	..	..	..	Johannesburg Invest	..	..	..	..	..	..
Camp Bird	1	7	6	1	6	10½	Modderfontein	9	15	0	9	2	6
Con. Gold Fields	6	16	3	6	6	3	Rand Mines	10	2	6	9	15	0
De Beers Con. def	20	3	9	19	16	3	Rio Tinto, com	46	0	0	46	5	0
East Rand	7	7	6	6	15	6	Simmer & Jack	1	7	7	1	6	9
El Oro, Mex	1	12	6	1	12	6	Tomboy	1	13	1½	1	14	3

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

ST. LOUIS, MO.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$10	300,000	$0.45	$0.70	Columbia Lead, Mo.	$10	50,000	$12.00	13.00
Catherine Lead, Mo.	10	50,000	1.50	3.00	Con. Coal, Ill	100	50,000	22.50	23.00
Central Coal & C	100	51,250	62.00	63.00	Doe Run Lead Co	100	15,000	107.00	110.00
Central C. & C., pf.	100	18,750	73.50	74.00	Granite Bimet. Mt.	10	100,000	.60	.68
Central Lead, Mo	10	100,000	120.00	130.00	St. Joe Lead, Mo,	10	600,000	16.00	17.00

*By our Special Correspondent.

PARIS. July 11.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Boleo	Lower Cal	Copper	.....	500	176.00	1,405.00	1,400.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	19.75	18.75
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	88.50	88.50
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	331.50	338.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	470.00	471.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	441.00	450.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	7.50	8.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	663.50	661.00

PHILADELPHIA, PA.*

Name and Location of Co.	Par val.	July 22. H.	July 22. L.	July 23. H.	July 23. L.	July 24. H.	July 24. L.	July 25. H.	July 25. L.	July 27. H.	July 27. L.	July 28. H.	July 28. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	.....	6¾	7	.....	6⅛	6¾	7	9⅞	6⅞	.....	7	.....	1,379
CambriaIron, Pa	50	.....	.....	.....	.....	46	.....	48	.....	.....	.....	.....	.....	5
Cambria S , Pa	50	22⅝	22	22¼	22	22⅛	22⅛	21⅞	21¾	22⅝	21¾	23	22⅝	8,681
Penn. Steel, pfd	100	.....	.....	87	.....	.....	.....	.....	.....	.....	.....	.....	.....	20
Susq. I & S., Pa	5	1 1/16	1	1 1/16	.....	1 1/16	.....	1 1/16	.....	1 1/16	.....	.....	.....	1,570
United Gas I. Pa	50	83⅜	82⅛	83⅜	83	83½	82	82⅛	82¼	85⅜	81⅞	84¾	83½	4,230
Warwick I. & S.	10	5	.....	5	4¾	4	.....	4¼	.....	.....	.....	.....	.....	705

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 16,520 shares.

TORONTO, ONT.*

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.	Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.04	.02	2,000	Granby Smelter	$10	4.75	3.75	.....
Cariboo (Mc. K.)	1	.13	.....	.....	Mountain Lion	1	.28	.20	.....
Cariboo (Hyd.)	1	.75	.....	.....	North Star	1	.14	.10½	.....
Center Star	1	.20	.24	.....	Nova Scotia Steel, com	100	.96	.90	.....
Crows Nest, C	100	3.50	2.75	.....	Payne	1	.22	.18	.....
Dominion Coal, com	100	.98	.88	.....	Rambler Cariboo	1	.45	.40	.....
Dominion S. & I	100	.15½	.11	25	Republic	1	.04	.02	.....
Dominion S. & I., pref.	100	.43	.....	.....	St. Eugene	1	.48	.40	.....
Fairview	1	.05½	.04	.....	Virtue	1	.07	.05	.....
Giant	1	.04	.03	5,000	War Eagle Con	1	.14	.11	3,000

*Standard Stock and Mining Exchange. Total sales, 10,025 shares.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.—UNITED STATES.

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued.	Par Val	Dividends Paid. 1903	Total to Date	Latest. Date.	Amt.
Acacia, g.	Colo.	$1,500,000	1,433,000	$1	$14,300	$57,560	Apr. 1903	.01
Adams, s. l. c.	Colo.	1,500,000	150,000	10		738,500	Oct. 1902	.05
Aetna Con., q.	Cal.	500,000	10,000	5		325,000	Apr. 1900	.15
Alaska-Maxican, g.	Alaska.	1,000,000	180,000	5	36,000	501,381	Apr. 1903	.10
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	230,000	5,050,000	Apr. 1903	.75
Amalgamated, c.	Mont.	155,000,000	1,538,879	100	1,538,880	21,195,540	May. 1903	.50
Am. Sm. & Ref., pf.	U. S.	50,000,000	500,000	100	2,625,000	11,318,553	July. 1903	1.75
Anaconda, c	Mont.	30,000,000	1,200,360	25	600,000	22,636,000	May. 1903	.50
Annie Laurie, g.	Utah	5,000,000	50,000	200	175,000	235,000	July. 1903	1.00
Arizona, c.	Ariz.	3,775,000			501,564	3,947,032	Feb. 1903	
Atlantic, c.	Mich.	1,000,000	40,000	25		940,000	Feb. 1901	2.00
Bald Butte, g. s.	Mont.	250,000	200,000	1	15,000	1,312,148	Jad. 1903	.06
Boston & Colo. Sm.	Colo.	750,000	15,000	50		402,350	Oct. 1902	.75
Boston Gold-Copper Sm	Colo.	1,000,000	1,000,000	1		10,000	Nov. 1901	5.02½
Boston & Mont. Con., c. s. g.	Mont.	3,750,000	150,000	25	600,000	27,725,000	Apr. 1903	2.00
Breece, l. s.	Colo.	5,000,000	200,000	25	10,000	200,000	June 1903	.05
Bunker Hill & Sullivan	Idaho	3,000,000	300,000	10	63,000	1,505,000	July. 1903	.03
Butte & Boston, c.	Mont.	2,000,000	200,000	10		1,600,000	Nov. 1901	3.00
Butterfly-Terrible, g.	Colo.	1,500,000	1,250,000	1		31,250	Oct. 1901	.00½
C. K. & N., g.	Colo.	1,500,000	1,431,900	1	28,638	42,957	June 1903	.01
Calumet & Hecla, c.	Mich.	2,500,000	100,000	25	1,500,000	81,351,000	June 1903	10.00
Camp Bird, g.	Colo.	5,500,000	820,000	5	528,900	770,300	July. 1903	.36
Carisa, g. s. c.	Utah	500,000	500,000	1		30,000	Nov. 1903	.03
Centennial Eureka, g. s. l. c.	Utah	5,000,000	100,000	25		2,667,700	Jan. 1902	.50
Center Creek, l. z.	Mo.	1,000,000	100,000	10		80,000	Mar. 1902	.10
Central Eureka, g.	Cal.	4,000,000	398,525	10		55,776	July. 1903	.02
Central, l.	Mo.	1,000,000	10,000	200	30,000	355,000	June 1903	.50
Champion, c.	Mich.	2,500,000	100,000	28	100,000	100,000	May. 1903	1.00
Chippewa Con., g. s. l.	Colo.	150,000	150,000	1		2,500	Dec. 1902	.0½
Con. Mercur, g.	Utah	5,000,000	1,000,000	5	150,000	1,000,000	May. 1903	.03
Continental, z.	Mo.	550,000	22,000	25	26,400	44,000	July. 1903	.40
Cripple Creek, g. pf.	Colo.	125,000	125,000	1		45,000	Jan. 1902	.40
Cresus, g.	Cal.	1,000,000	200,000	5		227,300	Aug. 1891	.05
Dolton & Lark, g. s. l.	Utah	2,500,000	2,500,000	1		350,000	July. 1901	.10½
Daly West.	Utah	3,000,000	180,000	20	756,000	3,015,000	July. 1903	.60
De Lamar, g. s.	Idaho	400,000	67,180	5		2,708,094	Oct. 1902	.48
Doctor-Jack Pot Con., g.	Colo.	3,000,000	2,900,000	1		232,000	Aug. 1901	.01
Doe Run, l	Mo.	1,500,000	15,000	100	67,500	604,572	July. 1902	1.50
Ducktown, c. i. sul. (Ord).	Tenn.	374,000	74,800	5		165,250	Dec. 1901	.25
Ducktown (Fndr).	Tenn.	1,000	200	5		75,250	May. 1901	75.00
Elkton Con., g.	Colo.	3,000,000	2,500,000	1		1,401,461	Mar. 1902	.04
Empire State-Idaho, l. s.	Idaho	6,000,000	505,542	10	176,939	1,738,601	July. 1903	.05
Free Coinage, g.	Colo.	1,000,000	10,000	100		160,000	Dec. 1902	.20
Gemini.	Utah	500,000	5,000	100	100,000	950,000	June. 1903	10.00
Gold Coin of Victor, g.	Colo.	1,000,000	1,000,000	1	10,000	1,230,000	Jan. 1903	.01
Gold King, g.	Colo.	1,000,000	936,850	1	46,842	459,056	July. 1903	.03
Golden Argus, g.	Cal.	800,000	8,000	100		2,000	Dec. 1902	.25
Golden Cycle, g.	Colo.	2,000,000	1,000,000	1	202,500	258,750	June 1903	.03
Golden Eagle, g.	Colo.	500,000	489,015	1		98,916	Sept. 1901	.01
Good Hope, g. s	Colo.	50,000	500	100	12,500	12,500	Jan. 1903	.25
Grand Central, g.	Utah	250,000	250,000	1	125,000	757,250	July. 1903	.10
Gwin, g.	Cal.	1,000,000	100,000	10		426,500	Dec. 1902	.15
Hecla, s. l.	Idaho	250,000	1,000,000	¼	20,000	120,000	June 1902	.02
Hecla Con., s. l.	Mont.	1,500,000	30,000	50		2,930,550	Apr. 1903	.25
Homestake, g.	S. D.	21,840,000	218,400	100	382,500	12,094,350	July. 1903	.25
Horn Silver, g. s. c. z. l.	Utah	10,400,000	400,000	25		5,312,000	Dec. 1901	.10
Independence Con., g.	Colo.	2,500,000	2,500,000	1		281,375	Apr. 1901	.04
Ingham Con., g.	Colo.	750,000	1,359,600	½		33,981	Aug. 1901	.00¼
International Nickel, pf.	U. S.	12,000,000	87,415	100	349,660	349,660	May. 1903	4.00
Iowa, g. s. l.	Colo.	1,666,667	1,666,667	1	50,001	320,170	July. 1903	.01
Iron Silver.	Colo.	10,000,000	500,000	20	100,000	2,750,000	May. 1903	.10
Isabella, g.	Colo.	2,250,000	1,250,000	1		742,500	Mar. 1901	.01
Jamison, g.	Cal.	3,900,000	390,000	10	11,700	74,100	Jan. 1903	.03
Kendall, g.	Mont.	2,500,000	500,000	5	60,000	135,000	July. 1903	.04
Kennedy, g.	Cal.	10,000,000	100,000	100		1,801,001	June 1903	.05
La Fortuna, g.	Ariz.	250,000	250,000	1		1,062,500	Oct. 1902	.05
Last Dollar, g.	Colo.	1,500,000	1,500,000	1	30,000	210,000	Mar. 1903	.02
Liberty Bell, g.	Colo.	700,000	130,349	1	39,104	58,129	Apr. 1903	.15
Lightner, g.	Cal.	125,000	107,255	1	15,339	48,669	May. 1903	.10
Lammoth, g. s. c.	Utah	10,000,000	400,000	25		1,880,000	July. 1901	.05
Mary McKinney, g.	Colo.	1,000,000	1,000,000	1	80,000	560,560	July. 1903	.03
May Day, g.	Utah	100,000	400,000	¼		30,000	Mar. 1902	.01
Midget, g.	Colo.	1,000,000	1,000,000	1		195,000	Apr. 1902	.15
Mines Co. of America, Finc'l.	U. S.	2,000,000	2,000,000	1	175,000	205,000	July. 1903	.01½
Modoc, g. s.	Colo.	500,000	500,000	1	5,000	235,000	Jan. 1903	.01
Mont. Ore Purchasing.	Mont.	2,500,000	81,000	25	324,000	2,970,000	June 1903	2.00
Mountain, c.	Cal.	6,250,000	250,000	25		3,633,750	Nov. 1902	.98
Mine La Mott, l.	Mo.	3,300,000	300,000	10	120,000	120,000	Apr. 1903	.20
Napa Con., q.	Cal.	700,000	100,000	7		1,180,000	Oct. 1902	.10
National Lead, com.	U. S.	15,000,000	159,054	100		1,341,488	Mar. 1900	1.00
National Lead, pf.	U. S.	15,000,000	149,040	100	521,640	13,448,528	June 1903	1.75
New Idra, q.	Cal.	5,000,000	100,000	5	60,000	460,000	Apr. 1903	.30
New Jersey, z.	U. S.	10,000,000	100,000	100	300,000	5,700,000	Feb. 1903	3.00
New Leadville Home, g.	Colo.	2,000,000	2,000,000	1		265,500	Feb. 1902	00.5⅝
Nugget, g.	Colo.	1,000,000	991,000	1		84,730	July. 1901	.01
Ontaria, s. l.	Utah	15,000,000	150,000	100		34,917,000	Dec. 1902	.02
Osceola, c.	Mich.	2,500,000	596,150	25		4,247,300	Dec. 1901	3.00
Parrot, c.	Mont.	2,300,000	229,850	10		5,772,955	Jan. 1902	.50
Pioneer, g.	Alaska.	5,000,000	50,000	100		300,000	Dec. 1902	6.00
Pointer, g.	Colo.	1,250,000	1,250,000	1		25,000	June 1901	.01
Portland, g.	Colo.	3,000,000	3,000,000	1	270,000	4,567,080	July. 1903	.03
Pride of the West.	Ariz.	1,500,000	150,000	10		15,000	Oct. 1902	.10½
Quicksilver, pf.	Cal.	4,300,000	43,000	100	21,500	1,931,411	May. 1903	.50
Quincy, c.	Mich.	2,500,000	100,000	25	250,000	13,820,000	Feb. 1903	2.50
Rob Roy, z.	Mo.	15,000	13,825	1	1,205	1,757	July. 1903	.02
Rocco-Homestake-Nevada, l. s.	Nev.	300,000	240,000	1		90,000	Nov. 1902	.01
Sacramento, g.	Utah	5,000,000	1,000,000	5	35,000	188,000	July. 1903	.00½
St. Joseph, l.	Mo.	6,000,000	375,000	10	112,500	3,722,000	June 1903	.15
Silver Hill, g. s.	Nev.	180,000	180,000	1	9,000	19,800	Mar. 1903	.05
Silver King, g. s. l.	Utah	3,000,000	150,000	20	700,000	6,750,000	July. 1903	.66⅔
Smuggler, s. l. z.	Colo.	1,000,000	1,000,000	5		2,175,000	Feb. 1902	.01
Spearfish, g. pf.	So. Dak	1,000,888	882,000	1	44,100	61,740	June 1903	.01
Specie Payment, 6.	Colo.	1,000,000	1,000,000	1		40,190	Oct. 1902	.00
Standard Con., g. s.	Cal.	2,000,000	178,394	10	35,678	4,142,492	May. 1903	.10
Standard, c.	Ariz.	500,000	400,000	1	20,000	20,000	June 1903	.15
Standard, s. l.	Idaho	500,000	500,000	1	175,000	2,895,000	July. 1903	.04
Stratton's Independence, g.	Colo.	5,500,000	1,060,007	5		3,665,271	Jan. 1902	.12
Swansea, s. l.	Utah	500,000	100,000	5		330,500	June 1902	.05
Syndicate, g.	Cal.	100,000	100,000	1		82,000	Aug. 1902	.52
Tamarack, c.	Mich.	1,500,000	60,000	25		8,490,000	Dec. 1901	10.00
Tomboy, g. s.	Colo.	1,500,000	300,000	5		1,244,000	July. 1902	.24
Town Topics, g. s.	Colo.	1,000,000	1,000,000		10,000	45,000	June 1903	.00½
Trimountain, c.	Mich.	2,500,000	100,000	25	300,000	300,000	June 1903	1.50
Trinity County, g.	Cal.	1,000,000	100,000	10	35,000	535,000	July. 1903	.05
United (Creed) g.	Colo.	500,000	500,000	1	10,000	45,000	May. 1903	.02
Union, g.	Colo.	1,250,000	1,250,000	1		445,244	Jan. 1902	.02
United, c. pf.	Mont.	5,000,000	50,000	100	150,000	300,000	May. 1903	.600
United, g.	Colo.	5,000,000	3,994,709	51	40,091	319,933	Jan. 1903	.01
United, z. l., com.	Mo.	5,000,000	78,900	7	7,764	22,961	Apr. 1903	.05
United, z. l., pf.	Mo.	1,000,000	18,998	25	17,040	99,095	Apr. 1903	.50
United Verde, c.	Ariz.	3,000,000	300,000	10	675,000	13,710,322	June 1903	.75
U. S. Red. & Ref., com.	Colo.	6,000,000	59,188	100	177,564	354,790	June 1903	1.00
U. S. Red. & Ref., pf.	Colo.	4,000,000	39,458	100	177,561	413,634	June 1903	1.50
Utah, g.	Utah	1,000,000	100,000	10	10,000	917,000	May. 1903	.02
Utah Con., c.	Utah	1,500,000	300,000	5	954,000	1,686,000	July. 1900	1.50
Vindicator Con., g.	Colo.	1,500,000	1,100,000	1	110,000	1,027,000	Apr. 1903	.05
Waldorf, g.	Colo.	3,000,000	3,000,000	1		24,500	Dec. 1902	.08
Wasp No. 2, g.	So. Dak	500,000	147,900	1		218,410	June 1902	.00½
White Rock, g.	Nev.	500,000	200,000	2½		2,000	Aug. 1903	.01
Wolverine, c.	Mich.	1,500,000	60,000	25	150,000	1,050,000	Apr. 1903	2.50
Yankee Con., g. s. l.	Utah	500,000	500,000	1		75,000	Apr. 1902	.05
Yellow Aster, g	Cal.	1,000,000	105,000	10	60,000	533,789	June 1903	.20

NOTE—These dividends are published gratuitously. Readers are invited to send any corrections or corrections which they think necessary to complete our list.

COAL, IRON AND INDUSTRIALS

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued.	Par Val	Dividends Paid 1903.	Total to Date.	Latest. Date.	Amt.
Ala. Con., Coal & Iron, pfd.	Ala.	$2,500,000	$24,638	$100	$83,234	$603,44[illegible]	June 1903	$1.75
Ala. & Ga. Iron, pfd.		650,000	6,500	100	6,500	6,500	Jan'. 1903	1.00
Allis-Chalmers, pfd.	U. S.	25,000,000	200,000	100	853,125	2,943,750	Aug. 1903	1.75
Alma Oil.	Cal.	400,000	380,000	1	22,800	22,800	June 1903	.03
Altoona Coal & Coke Co.	Pa.	2,500,000	250,000	10	544,050	4,126,710	Jan. 1901	.30
Amer. Agr. Chem., pfd.	U. S.	20,000,000	181,350	100	544,050	4,126,710	Apr. 1903	3.00
American Cement.	Pa.	2,100,000	200,000	10	240,000	620,000	July. 1903	.40
American Coal.	Md.	1,500,000	50,000	25	75,000	1,357,500	Mar. 1903	1.25
American Iron & Steel, com.	Pa.	17,000,000	34,000	50		256,100	May. 1902	.15
American Iron & Steel, pfd.	Pa.	3,000,000	60,000	50	75,000	525,000	Apr. 1903	.62½
American Steel Foundries, pfd.	U. S.	15,500,000	155,000	100	465,000	697,500	June 1903	1.50
Aztec Oil.	Cal.	250,000	235,000	1	9,400	25,850	May. 1903	.03
Cambria Steel.	Pa.	50,000,000	900,000	50	675,000	5,775,000	Feb. 1903	.75
Central Coal & Coke, com.	Mo.	5,125,000	51,250	100	230,625	474,375	July. 1903	1.50
Central Coal & Coke, pfd.	Mo.	1,875,000	18,750	100	70,311	773,435	July. 1903	1.25
Central Oil	W. Va.	1,500,000	60,000	25	15,000	137,500	May. 1903	.25
Central Oil.	Cal.	1,000,000	800,000	1		160,147	Jan. 1902	.03
Colorado Fuel & Iron, com.	Colo.	38,000,000	239,310	100		1,642,500	Apr. 1902	1.75
Colorado Fuel & Iron, pfd.	Colo.	2,000,000	20,000	100	80,000	1,590,000	Feb. 1903	4.00
Columbus & Hocking C. & I.	Ohio.	7,000,000	69,244	100	34,610	69,220	Mar 1903	.50
Consolidation Coal.	Md.	10,250,000	102,500	100	205,000	6,536,650	Jan. 1903	2.00
Consolidated Coal.	Ill.	5,000,000	50,000	100		100,000	Jan. 1902	1.00
Crucible Steel, pfd.	U. S.	25,000,000	250,000	100	875,000	4,812,500	June 1903	1.75
Cummings Cement.	N. Y.	300,000	3,000	100		180,000	July 1902	9.00
Dixon, Joseph, Crucible.	N. J.	1,000,000	7,345	100	14,690		Apr. 1903	1300
Empire Steel & Iron, pfd.	U. S.	5,000,000	23,700	100	35,550	355,442	Jan. 1903	1.50
Four Oil.	Cal.	300,000	208,700	1	12,522	30,653	July. 1903	.01
General Chem., com.	U. S.	12,500,000	74,103	100	185,258	1,115,279	June 1903	1.25
General Chem., pfd.	U. S.	12,500,000	100,000	100	441,240	2,416,418	July. 1903	1.50
George's Creek Coal and Iron.	Md.	2,500,000	22,000	100	33,000		Jan. 1903	3.00
Giant Oil.	Cal.	500,000	500,000	1	5,000	5,000	Jan. 1903	.01
Hanford Oil.	Cal.	20,000	2,000	10		13,000	Sept. 1902	1.50
Heywood Oil.	Tex.	800,000	800,000	1	16,000	144,000	Jan. 1903	.02
Higgins Oil.	Tex.	2,500,000	17,609	100		96,850	Apr. 1902	1.50
Home Oil.	Cal.	100,000	100,000	1	42,500	492,500	June 1903	.05
Homestake Oil.	Cal.	100,000	10,000	10		33,000	Aug. 1902	.15
Houston Oil, pfd.	Tex.	7,500,000	75,000	100	224,125	886,500	Feb. 1903	3 00
Imperial Oil.	Cal.	1,000,000	100,000	100	140,000	400,000	July. 1903	.20
Int'l Acheson Graphite, pfd.	N. Y.	500,000	5,000	100	17,500	87,500	Feb. 1903	5.50
Jeff. & Clearf., Coal & Iron, com.	Pa.	1,500,000	15,000	100		105,000	Aug. 1902	5.00
Jeff. & Clearf., Coal & Iron, pfd.	Pa.	1,500,000	15,000	100	37,500	503,000	Feb. 1903	2.50
Lehigh Coal & Nav.	Pa.	14,346,650	286,933	50	286,933	20,382,013	May. 1903	1.00
Maryland Coal, pfd.	Md.	2,000,000	18,850	100	65,975	951,885	July. 1903	3.50
Monongahela R. Coal, pfd.	Pa.	10,000,000	97,300	5	347,165	2,777,080	Jan. 1903	3.50
Monte Cristo Oil.	Cal.	500,000	500,000	1	20,000	20,000	May. 1903	.01
National Carbon, pf.	U. S.	4,500,000	45,000	100	157,500	1,427,500	May. 1903	1.75
Ohio & Indiana Natural Gas.	U. S.	10,000,000	900,000	100	180,000	1,260,000	June 1903	1.04
Pacific Coast Borax.	Cal.	2,000,000	19,000	100	133,000	1,450,500	July. 1903	1.00
Peerless Oil.	Cal.	1,000,000	92,000	10	79,120	126,400	July. 1903	.10
Pennsylvania Salt Mfg.	Pa.	5,000,000	100,000	50	150,000	13,300,300	Apr. 1903	3.00
Penna. Steel of N. J.	Pa.	25,000,000	168,214	100	588,750	2,517,000	Mar. 1902	3.50
Philadelphia Gas, com.	Pa.	16,102,131	308,542	50	649,218	3,185,425	Aug. 1903	.75
Philadelthia Gas, pfd.	Pa.	3,998,350	212,873	50	98,553	909,108	Mar. 1903	1.25
Pittsburg Coal, pfd.	Pa.	32,000,000	297,012	100	1,559,313	7,796,565	July. 1903	1.75
Pittsburg Oil.	Cal.	300,000	220,000	1	24,000	24,000	July. 1903	.02½
Rep. Iron & Steel, pfd.	U. S.	25,000,000	203,538	100	1,068,738	5,683,032	July. 1903	1.75
Retsof Salt.	N. Y.	5,000,000	36,000	100	72,000	648,000	Apr. 1903	1.00
San Joaquin Oil.	Cal.	100,000	100,000	1	20,000	180,000	June 1903	.10
Shelby Iron.	Ala.	1,000,000	10,000	100	10,000	700,000	May. 1903	10.00
Sloss-Sheffield Steel & Iron, pfd.	Ala.	20,000,000	65,085	100	342,000	1,596,000	July. 1903	1.75
St. Bernard Coal & Coke.	Ky-Ten.	1,000,000	10,000	100		770,000	Dec. 1902	6.00
Standard Oil (of N. J.).	U. S.	100,000,000	970,000	100	26,190	190,225,000	June 1903	7.00
Susquehanna I. & S., pfd.	Pa.	1,500,000	300,000	5	45,000	717,500	Jan. 1903	15
Temple Iron.	Pa.	240,000	2,400	100	14,400	21,600	July. 1903	3.00
Tenn. C. I. & R. R., com.	Tenn.	23,000,000	225,535	100		1,102,144	Nov. 1900	2.00
Tenn. C. I. & R. R., pfd.	Tenn.	248,000	2,480	100	14,880	302,095	Aug. 1903	2.00
Tex. & Pacific Coal.	Tex.	2,000,000	20,000	100	90,000	2,130,000	July. 1903	1.50
Thirty-three Oil.	Cal.	500,000	100,000	5	70,000	190,000	July. 1903	.10
Thomas Iron.	Pa.	2,500,000	25,000	200		200,000	Aug. 1902	4.00
Tidewater Steel, pfd.	Pa.	600,000	60,000	1	18,000	18,000	Jan. 1904	.30
Union Oil.	Cal.	10,000,000	52,672	100	36,870	334,495	Jan. 1903	.70
U. S. Steel Corp., com.	U. S.	50,000,000		100	15,249,075	50,809,577	Sept. 1903	1 00
U. S. Steel Corp., pfd.	U. S.	550,000,000	5,103,141	100	26,789,757	89,262,829	Aug. 1903	1.75
Va.-Carolina Chem., Com.	U. S.	538,000,000	279,844	100	699,611	3,678,879	June 1903	1 25
Va.-Carolina Chem., pfd.	U. S.	2,000,000	120,000	100	720,000	6,780,000	July 1903	2.00
Victoria Coal & Coke, com.	W. Va.	100,000	1,000	100		15,000	Jan. 1901	10.00
Victoria Coal and Coke, pfd.	W. Va.	100,000	1,000	100		15,000	July 1902	3.00
Westmoreland Coal.	Pa.	5,000,000	250,000	50	375,000	7,875,000	Apr. 1903	1.50
West Shore Oil.	Cal.	100,000	100,000	1	35,000	80,000	July 1903	.05

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Author-ized Capital Stock.	Shares. Issued.	Par val	Dividends Paid 1903.	Total to Date.	Latest. Date.	Amt.
Amistad y Concordia.	Mex.	$480,000	9,000	$50	$41,868	$120,898	Apr. 1903	$2.00
Barreno.	Mex.		2,400		12,364	65,914	July. 1903	.82
Bartolome de Medina Mill.	Mex.	50,000	2,000	25	9,565	73,048	July. 1903	.62
Buena Vista, g. s.	Mex.	100,000	1,000	100	5,000	5,000	June 1903	5.00
Butler's Salvador.	Salv.	750,000	150,000	5	36,000	36,000	May. 1903	.24
Cariboo McKinney.	B. C.	1,250,000	1,250,000	1		496,837	Mar. 1902	.01½
Center Star, g.	B. C.	3,500,000	3,500,000	1		210,000	May. 1901	.01
Cinco Senores.	Mex.		2,000		55,870	711,935	July. 1903	4.10
Copiapo, c.	Chile.	1,125,000	112,500	10	39,900	2,835,000	Feb. 1903	.36
Dolores, g. s.	Mex.	100,000	100,000	1	25,000	25,000	Jan. 1905	.25
Dominion Iron & Steel, pf.	N. S.	5,000,000	50,000	100	175,000	700,000	Apr. 1903	3.50
Dominion Coal, pf.	N. S.	3,000,000	30,000	100	180,000	2,340,000	July. 1903	2.00
Dos Estrellas.	Mex.	150,000	3,000	50	183,150	408,150	July. 1903	12.30
El Oro, g. s	Mex.	5,000,000	1,000,000	5		1,886,100	Dec. 1903	.36
Esperanza, s. g.	Mex.	150,000	3,000	50	70,920	1,140,999	July. 1903	4.10
Fraternal, s.	Mex.	5,000	1,000	5	8,600	38,100	June 1903	4.30
Goodenough, s. l.	B. C.	800,000	659,400	1		13,188	Jan. 1902	.01
Green Con., c.	Mex.	7,200,000	720,000	10	432,000	652,000	May. 1903	.20
Guadalupana	Mex.	1,000,000	3,000	5	6,930	69,930	Mar. 1903	.77
Guadalupe Mill.	Mex.	1,000,000	10,000	100	30,800	1,515,750	Apr. 1903	.77
Le Roi, g.	B. C.	5,000,000	200,000	25		1,305,000	Nov. 1899	1.20
Le Roi No. 2. g.	B. C.	3,000,000	120,000	35		288,000	May. 1902	1.20
Mesquital	Mex.	125,000	250,000	½	15,000	51,458	Feb. 1903	.06
Metalurgical Co, of Torreou.	Mex.	1,500,000	30,000	50	234,500	239,500	Apr. 1903	8.98
Natitivad, s. g.	Mex.	36,000	2,400	15	50,640	214,200	July. 1903	4.10
N. Y. & Hond. Rosario, s. g.	C. A.	1,500,000	150,000	10	105,000	1,855,000	July. 1903	.10
North Star, s. l.	B. C.	1,500,000	1,300,000	1		581,356	Dec. 1902	.01
Nova Scotia St. & Coal, com.	N. S.	5,000,000	41,200	100	123,600	391,400	Apr. 1903	1.00
Nova Scotia St. & Coal, pfd.	N. S.	2,000,000	10,300	100	61,800	185,400	July. 1903	2.00
Providencia (S. J.).	Mex.	90,000	6,000	15	13,860	174,390	Mar. 1903	.77
Rambler-Cariboo, s. l.	B. C.	1,250,000	1,250,000	1		230,000	Nov. 1902	.01½
Real del monte.	Mex.		2,554		20,815	2,804,035	June 1903	4.30
St. John del Rey, g.	Brazil	3,000,000	546,265	5	87,402	14,093,397	June 1903	.16
Soledad, s. l.	Mex.	15,200	960	20	19,287	241,528	July. 1903	2.05
Sorpresa.	Mex.	19,200	960	20	3,852	189,503	May. 1903	2.10
Sta. Maria de Guadalupe.	Mex.	2,500	2,500	1		377,918	Sept. 1 02	4.08
Sta. Maria de la Paz.	Mex.		2,400		23,040	1,871,313	June 1903	9.60
San Francisco Mill.	Mex.	50,000	6,000	25		284,700	Nov. 1902	.40
Sta. Gertrudis.	Mex.	1,920,000	38,000	50	95,640	2,742,984	July. 1903	
San Rafael.	Mex.	60,000	2,400	25	78,820	1,851,888	July. 1903	
Union Mill.	Mex.	150,000	3,000	50	17,775	402,245	June 1903	2.15
Ymir, g.	B. C.	1,000,000	200,000	5		288,000	Mar. 1902	.23

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

ABRASIVES—	Cust.	Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09¼
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03¼
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02½
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01½@.02
Italian, powdered	"		.01½
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04¼
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07

ACIDS—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas	"	.12½
Chromic, crude	"	.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06

ALCOHOL—Grain	gal.	2.30@2.40
Refined wood, 95@97%	"	.60@.65
Purified	"	1.30@1.50

ALUM—Lump	100 lbs.	1.75
Ground	"	1.85
Porous	"	.80
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00

ALUMINUM—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, com'l	"	1.25@1.50

AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.04½

AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate	"	.05½
Lump	"	.09
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12

ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.07½@.08
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.03½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16

ARSENIC—White powd.	"	.02½@.03
Red	"	.03½@.04½

ASPHALTUM—		
Ventura, Cal.	sh. ton	32.00
Cuban	lb.	.01¼@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾

BARIUM—		
Carb. Lump, 80@90%	sh. ton	25.00@27.00
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst.	lb.	.05
Nitrate, powdered	"	.05½

BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.01⅞

BARYTES—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		19.00

BAUXITE—Ga. or Ala. Mines:		
First grade	lg. ton	5.50
Second grade	"	4.75

BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25

BITUMEN—"B"	"	.03½
"A"	"	.05

BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMIDE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50

CALCIUM—Acetate, gray	"	1.40
" brown	"	.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00
Carbonate, ppt.	lb.	.05
Chloride	100 lbs.	.70@.90

CEMENT—		
Portland, Am., 400 lbs.	bbl.	2.00@2.15
Foreign	"	1.95@2.50
"Rosendale," 300 lbs.	"	.80
Slag cement	"	1.50@1.60

CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14

CHALK—Lump, bulk	sh. ton	3.25
Ppt. per quality	lb.	.04@.05¼

CHLORINE—Liquid	"	.30
Water	"	.10

CHROME ORE		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00

CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y.	"	9.25
English, common	"	10.50
Best grade	"	16.25
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00

COAL TAR PITCH	gal.	.08

COBALT—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide - Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20

COPPERAS—Bulk	100 lbs.	.47½
In bbls.	"	.52½

COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19

CRYOLITE	"	.06½

EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine)	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32-2-10° Be.)	"	.13¼@.13⅞

FELDSPAR—Ground	sh. ton	8.00@9.00

FLINT PEBBLES—Dan. Best.	lg. ton	14.75
French, Best	"	11.75

FLOURSPAR—		
Am. lump, 1st grade	sh. ton	14.40
2d grade	"	13.90
Gravel and crushed, 1st gr.	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
Ground, 2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00

FULLER'S EARTH	100 lbs.	.80

GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton	$8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. pulv.	lb.	.01½@.01⅝
Best pulverized	"	.01⅝@.02
Ceylon, common pulv.	"	.02¾@.03¼
Best pulverized	"	.04@.08
Italian, pulv.	"	01¼

GYPSUM—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00

INFUSORIAL EARTH—Gr'd.		
American best	"	20.00
French	"	37.50
German	"	40.00

IODINE—Crude	100 lbs.	2.45

IRON—Muriate	lb.	.05
Nitrate, com'l	"	.01¾
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03

KAOLIN—(See China Clay.)		

KRYOLITH—(See Cryolite.)		

LEAD—Acetate, white	"	.08¼@.08½
Brown	"	.06¼@.06½
Nitrate, com'l	"	.06½
" gran.	"	.08¼

LIME—Com., abt. 250 lbs.	bbl.	.75
Finishing	"	.95

MAGNESITE—Greece.		
Crude (95%)	lg. ton	5.50@6.00
Calcined	sh. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
" domes., per qual., f.o.b. Pittsburg	"	150.00@200.00

MAGNESIUM—		
Carbonate, light, fine pd.	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95

MANGANESE—		
Crude powd.		
70@75% binoxide	lb.	.01¼@.01⅜
75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, 50%, Foreign	unit	.18@.19
Domestic	"	.30

MARBLE—Flour	sh. ton	6.00@7.00

MERCURY—Bichloride	lb.	.77

MICA—N. Y. gr'nd, coarse	sh. ton	33.00@38.00
Fine	lb.	.00½@.02
Sheets, N. C., 2x4 in.	"	.30
3x3 in	"	.80
3x4 in.	"	1.50
4x4 in.	"	2.00
6x6 in.	"	3.00

MINERAL WOOL—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00

NICKEL Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21

OILS—Black, reduced 29 gr.:		
25@30, cold test	gal.	.13@.13½
15, cold test	"	.13½@.14
Zero	"	.18@.18½
Summer	"	.12½@.13
Cylinder, dark steam ref.	"	.14½@.15
Dark, filtered	"	.18½@.19
Light, filtered	"	.20½@.20
Extra cold test	"	.25@.31
Gasoline, 86° @90°	"	.16@.21
Naphtha, crude, 68°@72°	bbl.	11.20
"Stove"	gal.	.14½
Linseed, domestic raw	"	.37@.40
Boiled	"	.42
Calcutta, raw	"	.75

OZOKERITE	lb.	.11½

PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	.10¼
Best	"	.14
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. pow'd	"	.05¾@.06
English flake	"	.08¼@.08½
Glassmakers'	"	.06½@.08¼

PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh. ton		$19.00
Red	"		15.00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01¼@.01½
Orange mineral, Am.	"		.08¼@.08½
Foreign, as to make	"		.08½@.10¾
Paris green, pure, bulk	"		.12
Red lead, American	"		.06½@.06½
Foreign	"		.06⅝@.06
Turpentine, spirits	gal.		.51@.51½
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex. dry	"		.04⅝@.04¾
Foreign, red seal, dry	"		.06@.06½
Green seal, dry	"		.06½@.06½

POTASH—		
Caustic, ordinary	"	.04½@.04⅝
Elect. (90%)	"	.06¼

POTASSIUM—		
Bicarbonate cryst.	"	.08½
Powdered or gran.	"	.14
Bichromate, Am	"	.08½@.08¼
Scotch	"	.08½@.09
Bromide	"	.25@.38
Carbonate (80@85%)	"	.03½@.04¾
Chlorate, powd	"	.07¼@.07¾
Crystals	"	.07@.07½
Chromate	"	.35
Cyanide (98@99%)	"	.20
Kainit	lg. ton	9.30
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09½@.09⅝
Prussiate, yellow	"	.13¾@.13½
Red	"	.34
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41

QUARTZ—(See Silica).		

SALT—N. Y. com. fine 280 lbs bbl.		.72@1.18
N. Y. agricultural	sh. ton	4.40

SALTPETRE—Crude	100 lbs.	3.20@3.35
Refined	"	4.00@4.50

SILICA—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord.	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75

SILVER—Chloride	oz.	.65
Nitrate Crystals	"	.33½
Oxide	"	.85@1.10

SODIUM—		
Bicarb., ordinary, f.o.b. wk's.	100 lbs.	1.25
Extra domes., f.o.b. w'ks.	"	3.50
Foreign, f.o.b. N. Y.	"	1.60
Bichromate	lb.	.06¾
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.	.75@.85
Foreign, f.o.b. N. Y.	"	.90@.92½
Caustic, 60@76%, f.o.b. w'ks.	"	1.65@1.70
Foreign, f.o.b. N. Y.	"	1.50@2.00
Chlorate, com'l	"	.07¼@.07⅝
Hyposulphite, Am.	"	1.60@1.65
German	"	1.70@1.90
Nitrate, spot	"	2.05
Shipments	"	2.00
Peroxide	lb.	.45
Phosphate	"	.02½@.02¼
Prussiate	"	.09¾
Sal soda, f.o.b. works	100 lbs.	.90
Foreign, f.o.b. N. Y.	"	.07½
Silicate, conc.	lb.	.05
Com'l	"	.01
Sulphate, com'l	100 lbs.	.82½
Sulphide	lb.	.01¾
Sulphite crystals	"	.02¾

SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.15

TALC—N. C., 1st grade	sh. ton	20.00
N. Y., Fibrous, best	"	10.28
French, best	100 lbs.	2.25
Italian, best	"	2.62½

TAR—Regular	bbl.	2.40
Oil	"	4.40

TIN—Crystals	lb.	.22½@.23
Oxide	"	.45

URANIUM—Oxide	"	2.25@3.00

ZINC—Metallic, ch. pure	"	.07@.09½
Carbonate, ppt.	"	.09
Chloride solution, com'l	"	.02¼
Chloride granular	"	.04¼@.04⅝
Dust	"	.04½@.04½
Sulphate	"	.02½@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.80
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.80
STRONTIUM—Nitrate	lb.	.07½@.08⅝
THORIUM—Nitrate 49@50%	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.